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(71) Applicant *(for all designated States except US)*: **SYNGENTA PARTICIPATIONS AG** [CH/CH]; Schwarzwaldallee 215, CH-4058 Basel (CH).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **LÜTHY, Christoph** [CH/CH]; Mittelweg 1, CH-4142 Münchenstein (CH). **SCHAETZER, Jürgen** [DE/DE]; Holbeinstrasse 1, 79618 Rheinfelden (DE). **EDMUNDS, Andrew** [GB/CH]; Clarastrasse 5, CH-4058 Basel (CH).

(74) Agent: **BASTIAN, Werner**; Syngenta Participations AG, Intellectual Property, P.O. Box, CH-4002 Basel (CH).

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(54) Title: ACYLATED PHENYL OR PYRIDINE HERBICIDES

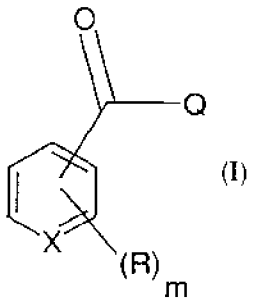
(57) Abstract: Compounds of formula (I) wherein X is methine, nitrogen or N=O; m is 1, 2, 3 or 4; Q is (Q_1), (Q_2), or (Q_3) or (Q_4) and the other substituents are as defined in claim 1, exhibit herbicidal activity.

ACYLATED PHENYL OR PYRIDINE HERBICIDES

The present invention relates to novel, herbicidally active benzoyl derivatives, to a process for their preparation, to compositions comprising those compounds, and to their use in controlling weeds, especially in crops of useful plants, or in inhibiting plant growth.

Benzoyl derivatives having herbicidal action are described, for example, in WO 97/08164, WO 99/09023 and EP-A-0 249 813. Novel benzoyl derivatives having herbicidal and growth-inhibiting properties have now been found.

The present invention accordingly relates to compounds of formula I



(I)

wherein X is methine, nitrogen or N=O;

m is 1, 2, 3 or 4;

each R is independently hydrogen, C_1-C_6alkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_2-C_6-alkynyl, C_2-C_6haloalkynyl, C_3-C_6cycloalkyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_1-C_6alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkyl, C_1-C_6haloalkylthio, C_1-C_6haloalkyl-sulfinyl, C_1-C_6haloalkylsulfonyl, C_1-C_6alkoxycarbonyl, C_1-C_6alkylcarbonyl, C_1-C_6alkylamino, di-C_1-C_6alkylamino, C_1-C_6alkylaminosulfonyl, di-C_1-C_6alkylaminosulfonyl, -N(R_1)-S-R_2, -N(R_3)-SO-R_4, -N(R_5)-SO_2-R_6, nitro, cyano, halogen, hydroxy, amino, formyl, hydroxy-C_1-C_6alkyl, C_1-C_6alkoxy-C_1-C_6alkyl, C_1-C_6alkoxycarbonyloxy-C_1-C_6alkyl, C_1-C_6alkylthio-C_1-C_6alkyl, C_1-C_6alkylsulfinyl-C_1-C_6alkyl, C_1-C_6alkylsulfonyl-C_1-C_6alkyl, rhodano-C_1-C_6alkyl, cyano-C_1-C_6alkyl, oxiranyl, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, C_1-C_6alkoxy-C_1-C_6alkoxy-C_1-C_3alkyl, C_1-C_6alkoxy-C_1-C_6alkoxy, cyano-C_1-C_6alkenyloxy, C_1-C_6alkoxycarbonyloxy-C_1-C_6alkoxy, C_3-C_6alkynyloxy, cyano-C_1-C_6alkoxy, C_1-C_6alkoxycarbonyl-C_1-C_6alkoxy-C_1-C_3alkyl, C_1-C_6alkoxycarbonyl-C_1-C_6alkoxy, C_1-C_6alkylthio-C_1-C_6alkoxy, C_1-C_6alkylthio-C_1-C_6alkoxy-C_1-C_3alkyl, alkoxycarbonyl-C_1-C_6alkylthio, alkoxycarbonyl-C_1-C_6alkylthio-C_1-C_3-alkyl, alkoxycarbonyl-C_1-C_6alkylsulfinyl, alkoxycarbonyl-C_1-C_6alkylsulfinyl-C_1-C_3alkyl,

alkoxycarbonyl-C_1-C_6alkylsulfonyl, alkoxycarbonyl-C_1-C_6alkylsulfonyl-C_1-C_3alkyl, C_1-C_6-alkylsulfonyloxy, C_1-C_6haloalkylsulfonyloxy, phenyl, benzyl, phenoxy, phenylthio, phenylsulfinyl, phenylsulfonyl, benzylthio, benzylsulfinyl or benzylsulfonyl, wherein the phenyl and benzyl groups may themselves be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6halo-alkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6-haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6haloalkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetyl-alkylthio, C_3-C_6alkoxycarbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6halo-alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2alkylamino-sulfonyl, C_2-C_4dialkylaminosulfonyl, R_7-C_1-C_3alkylene-, NR_8R_9, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein those phenylthio and benzylthio groups may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;

or each R is independently a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur;

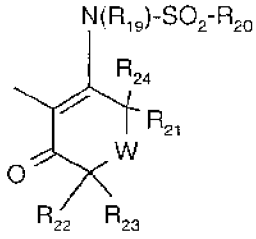
the ring system either being bonded directly to the ring containing the substituent X or being bonded to the ring containing the substituent X by way of a C_1-C_4alkylene group;

and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6halo-alkylthio, C_3-C_6alkenylthio, C_3-C_6haloalkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxycarbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_4alkyl-aminosulfonyl, C_1-C_4dialkylaminosulfonyl, R_{10}-C_1-C_3alkylene, $NR_{11}R_{12}$, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents at the nitrogen atom in the heterocyclic ring are free of halogen;

R_1, R_3 and R_5 are each independently of the others hydrogen or C_1-C_6alkyl;

R_2 is $NR_{13}R_{14}$, C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6cycloalkyl or phenyl, wherein phenyl may itself be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;

R_4 is $NR_{15}R_{16}$, C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6cycloalkyl or phenyl, wherein phenyl may itself be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;
R_6 is $NR_{17}R_{18}$, C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6cycloalkyl or phenyl, wherein phenyl may itself be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;
R_7 and R_{10} are each independently of the other C_1-C_3alkoxy, C_2-C_4alkoxycarbonyl, C_1-C_3-alkylthio, C_1-C_3alkylsulfinyl, C_1-C_3alkylsulfonyl or phenyl, wherein phenyl may itself be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;
R_8, R_{11}, R_{13}, R_{15} and R_{17} are each independently of the others C_1-C_{12}alkyl;
R_9, R_{12}, R_{14}, R_{16} and R_{18} are each independently of the others C_1-C_{12}alkyl, or R_8 and R_9 together, and/or R_{11} and R_{12} together, and/or R_{13} and R_{14} together, and/or R_{15} and R_{16} together, and/or R_{17} and R_{18} together, with the nitrogen atom to which they are bonded, form a 3- to 7-membered ring;
Q is the group Q_1



(Q_1),

wherein
R_{19} is hydrogen or C_1-C_6alkyl;
R_{20} is C_1-C_{12}alkyl, C_1-C_{12}haloalkyl, C_2-C_{12}alkenyl, C_2-C_6haloalkenyl, C_1-C_2alkoxycarbonyl- or phenyl-substituted vinyl, or is C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6allenyl, C_3-C_6cycloalkyl, $NR_{32}R_{33}$, benzyl or phenyl,
wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3-haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{20} is hydroxy-C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkylsulfinyl-C_1-C_{12}-alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_6alkylcarbonyloxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_6oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4-alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl or formyl-C_1-C_{12}alkyl;

or R_{20} is a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, the ring system being bonded to the sulfur atom of the $-N(R_{19})-S(O)_2-$ group by way of a C_1-C_{12}alkylene group, and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6-haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6halo-alkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxy-carbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6alkyl-sulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2alkylaminosulfonyl, di(C_1-C_2alkyl)-aminosulfonyl, di(C_1-C_4alkyl)amino, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents at the nitrogen atom in the heterocyclic ring are free of halogen;

R_{21}, R_{22}, R_{23} and R_{24} are each independently of the others hydrogen, C_1-C_6alkyl, C_1-C_6-haloalkyl, C_2-C_6alkenyl, C_2-C_6alkynyl, C_1-C_6alkoxycarbonyl, C_1-C_6alkylcarbonyl, C_1-C_6-alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6alkyl-$NHS(O)_2$, C_1-C_6alkylamino, di-(C_1-C_6alkyl)amino, hydroxy, C_1-C_6alkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, hydroxy-C_1-C_6-alkyl, C_1-C_4alkylsulfonyloxy-C_1-C_6alkyl, tosyloxy-C_1-C_6alkyl, halogen, cyano, nitro, phenyl or phenyl substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4-alkylcarbonyl, C_1-C_4alkoxycarbonyl, amino, C_1-C_4alkylamino, di-C_1-C_4alkylamino, C_1-C_6-alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_4alkylsulfonyloxy, C_1-C_6haloalkylthio, C_1-C_6haloalkylsulfinyl, C_1-C_6haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-$S(O)_2NH$, C_1-C_6alkylthio-$N(C_1$-C_4alkyl), C_1-C_6alkylsulfinyl-$N(C_1$-C_4alkyl), C_1-C_6alkylsulfonyl-$N(C_1$-C_4alkyl), halogen, nitro, COOH or by cyano; or R_{24} and R_{21} together or R_{22} and R_{23} together denote C_2-C_6alkylene, $C(O)OCH_2CH_2$-, $C(O)OCH_2CH_2CH_2$-, S-C_2-C_4alkylene, S(O)-C_2-C_4alkylene or $S(O)_2$-C_2-C_4alkylene;

W is oxygen, sulfur, sulfinyl, sulfonyl, $-CR_{25}$, R_{26}-, -C(O)-, $-CR_{28}R_{29}-CR_{30}R_{31}$- or $-NR_{27}$, wherein the carbon atom carrying the substituents $R_{28}R_{29}$ is attached to the carbon atom carrying the substituents $R_{22}R_{23}$;

R_{25} is hydrogen, C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy-C_1-C_4alkyl, C_1-C_4alkylthio-C_1-C_4-alkyl, C_1-C_4alkylthio-C_3-C_6cycloalkyl, C_1-C_4alkylcarbonyloxy-C_1-C_4alkyl, C_1-C_4alkylsulfonyl-oxy-C_1-C_4alkyl, tosyloxy-C_1-C_4alkyl, di(C_1-C_3alkoxyalkyl)methyl, di(C_1-C_3alkylthioalkyl)-

methyl, (C_1-C_3alkoxyalkyl)-(C_1-C_3alkylthioalkyl)methyl, C_3-C_5oxacycloalkyl, C_3-C_5thiacycloalkyl, C_3-C_4dioxacycloalkyl, C_3-C_4dithiacycloalkyl, C_3-C_4oxathiacycloalkyl, formyl, C_1-C_4alkoxycarbonyl, carbamoyl, C_1-C_4alkylaminocarbonyl, di(C_1-C_4alkyl)aminocarbonyl, phenylaminocarbonyl, benzylaminocarbonyl or phenyl which may itself be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4alkoxycarbonyl, amino, C_1-C_4alkylamino, di-C_1-C_4alkylamino, C_1-C_4alkylthio, C_1-C_4alkylsulfinyl, C_1-C_4alkylsulfonyl, C_1-C_4alkylsulfonyloxy, C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-S(O)$_2$NH, C_1-C_6alkylthio-N-(C_1-C_4alkyl), C_1-C_6alkylsulfinyl-N(C_1-C_4alkyl), C_1-C_6alkylsulfonyl-N(C_1-C_4alkyl), halogen, nitro, COOH or by cyano; or R_{26} together with R_{23} or R_{24} denotes C_1-C_5alkylene;

R_{26} is hydrogen, C_1-C_4alkyl or C_1-C_4haloalkyl, or R_{26} together with R_{25} denotes C_2-C_6-alkylene;

R_{27} is hydrogen, C_1-C_4alkyl, C_1-C_4alkoxycarbonyl or phenyl which may itself be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4alkoxycarbonyl, C_1-C_4alkylamino, di-C_1-C_4alkylamino, C_1-C_4alkylthio, C_1-C_4alkylsulfinyl, C_1-C_4alkylsulfonyl, C_1-C_4alkylsulfonyloxy, C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-S(O)$_2$NH, C_1-C_4alkyl-S(O)$_2$N(C_1-C_4alkyl), halogen, nitro or by cyano;

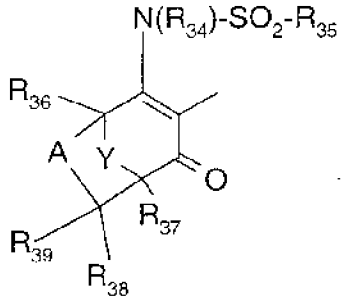
R_{28}, R_{29}, R_{30} and R_{31} are each independently of the others hydrogen or C_1-C_6alkyl, or R_{26} or R_{28} or R_{30} together with R_{21} or R_{23} form a direct bond;

R_{32} is C_1-C_{12}alkyl;

R_{33} is C_1-C_{12}alkyl, or R_{32} and R_{33} together with the nitrogen atom to which they are bonded form a 3- to 7-membered ring;

with the proviso that R_{20} is other than C_1-C_{12}alkyl and C_1-C_4haloalkyl when X is nitrogen or NO, the group -C(O)-Q occupies the 3-position in the ring and R in the 6-position in the ring is C_1-C_6haloalkyl,

or Q is the group Q_2



(Q_2),

wherein

R_{34} is hydrogen or C_1-C_6alkyl;

R_{35} is C_1-C_{12}alkyl, C_1-C_{12}haloalkyl, C_2-C_{12}alkenyl, C_2-C_6haloalkenyl, C_1-C_2alkoxycarbonyl- or phenyl-substituted vinyl, or is C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6allenyl, C_3-C_6cycloalkyl, $NR_{51}R_{52}$, benzyl or phenyl,

wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3-haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{35} is hydroxy-C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkylsulfinyl-C_1-C_{12}-alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_6alkylcarbonyloxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_6oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl or formyl-C_1-C_{12}alkyl;

or R_{35} is a five-to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, the ring system being bonded to the sulfur atom of the $-N(R_{34})-S(O)_2-$ group by way of a C_1-C_{12}alkylene group, and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6-haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6halo-alkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxy-carbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6alkyl-sulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2alkylaminosulfonyl, di(C_1-C_2alkyl)-aminosulfonyl, di(C_1-C_4alkyl)amino, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents on the nitrogen atom in the hetero-cyclic ring are other than halogen;

Y is a chemical bond, an alkylene group A_1, carbonyl, oxygen, sulfur, sulfinyl, sulfonyl, $-NR_{40}$ or $NH(CO)R_{41}$;

A_1 is $C(R_{42}R_{43})m_{01}$;

A is $C(R_{44}R_{45})r$;

r and m_{01} are each independently of the other 0, 1 or 2;

R_{36} is hydrogen, methyl or C_1-C_3alkoxycarbonyl;

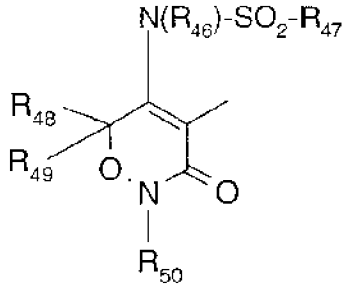
R_{37}, R_{38}, R_{39}, R_{44}, R_{45}, R_{42} and R_{43} are each independently of the others hydrogen, C_1-C_4-alkoxy, C_1-C_4alkylthio, C_1-C_4alkylsulfinyl, C_1-C_4alkylsulfonyl, halogen or methyl, or R_{39} together with an adjacent group R_{45} or R_{43} denotes a chemical bond;

R_{40} and R_{41} are each independently of the other hydrogen or C_1-C_4alkyl;

R_{51} is C_1-C_{12}alkyl; and

R_{52} is C_1-C_{12}alkyl; or R_{51} and R_{52} together with the nitrogen atom to which they are bonded form a 3- to 7-membered ring; with the proviso that R_{34} is C_5-C_6alkyl when R_{35} is C_1-C_4alkyl or C_1-C_4haloalkyl and X is nitrogen or NO;

or Q is the group Q_3



(Q_3),

wherein

R_{46} is hydrogen or C_1-C_6alkyl;

R_{47} is C_1-C_{12}alkyl, C_1-C_{12}haloalkyl, C_2-C_{12}alkenyl, C_2-C_6haloalkenyl, C_1-C_2alkoxycarbonyl- or phenyl-substituted vinyl, or is C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6allenyl, C_3-C_6cycloalkyl, $NR_{53}R_{54}$, benzyl or phenyl, wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{47} is hydroxy-C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkylsulfinyl-C_1-C_{12}alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_6-alkylcarbonyloxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_6oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl or formyl-C_1-C_{12}alkyl;

or R_{47} is a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, the ring system being bonded to the sulfur atom of the $-N(R_{46})-S(O)_2-$ group by way of a C_1-C_{12}alkylene group, and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6-haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy,

C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6haloalkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxycarbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2alkylaminosulfonyl, di(C_1-C_2alkyl)aminosulfonyl, di(C_1-C_4alkyl)amino, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents at the nitrogen atom in the heterocyclic ring are free of halogen;

R_{48} and R_{49} are each independently of the other hydrogen, C_1-C_4alkyl, C_2-C_6alkenyl, C_2-C_6alkynyl, C_1-C_4alkoxycarbonyl, C_1-C_6alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_4alkyl-NHS(O)$_2$, C_1-C_4haloalkyl, or phenyl which may itself be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4alkoxycarbonyl, amino, C_1-C_4alkylamino, di-C_1-C_4alkylamino, C_1-C_6alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6-alkylsulfonyl, C_1-C_4alkylsulfonyloxy, C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4-haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-S(O)$_2$NH, C_1-C_4alkyl-S(O)$_2$N(C_1-C_4-alkyl), halogen, nitro, COOH or by cyano; or R_{48} and R_{49} together form a C_2-C_6alkylene bridge; and

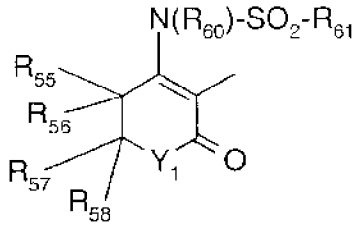
R_{50} is hydrogen, C_1-C_6alkyl, C_3-C_6alkenyl, C_3-C_6alkynyl, C_1-C_4alkoxycarbonyl, benzyl or phenyl, wherein benzyl or phenyl may themselves be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4-haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4alkoxycarbonyl, amino, C_1-C_4alkylamino, di-C_1-C_4-alkylamino, C_1-C_4alkylthio, C_1-C_4alkylsulfinyl, C_1-C_4alkylsulfonyl, C_1-C_4alkylsulfonyloxy,
C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-S(O)$_2$NH, C_1-C_4alkyl-S(O)$_2$N(C_1-C_4alkyl), halogen, nitro, COOH or by cyano;

R_{53} is C_1-C_{12}alkyl and

R_{54} is C_1-C_{12}alkyl, or R_{53} and R_{54} together with the nitrogen atom to which they are bonded form a 3- to 7-membered ring;

with the proviso that R_{46} is C_5-C_6alkyl when R_{47} is C_1-C_4alkyl or C_1-C_4haloalkyl and X is nitrogen or NO;

or Q is the group Q_4



(Q4),

wherein

R_{60} is hydrogen or C_1-C_6alkyl;

R_{61} is C_1-C_{12}alkyl, C_1-C_{12}haloalkyl, C_2-C_{12}alkenyl, C_2-C_6haloalkenyl, C_1-C_2alkoxycarbonyl- or phenyl-substituted vinyl, or is C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6allenyl, C_3-C_6cycloalkyl, $NR_{62}R_{63}$, benzyl or phenyl, wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{61} is hydroxy-C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkylsulfinyl-C_1-C_{12}alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_5-alkylcarbonyloxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, -rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_6oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl or formyl-C_1-C_{12}alkyl;

or R_{61} is a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, the ring system being bonded to the sulfur atom of the $-N(R_{60})-S(O)_2-$ group by way of a C_1-C_{12}alkylene group, and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6-haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6halo-alkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxy-carbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6-alkylsulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2alkylaminosulfonyl, di(C_1-C_2alkyl)-aminosulfonyl, di(C_1-C_4alkyl)amino, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents at the nitrogen atom in the heterocyclic ring are free of halogen;

R_{62} is C_1-C_{12}alkyl and

R_{63} is C_1-C_{12}alkyl, or R_{62} and R_{63} together with the nitrogen atom to which they are bonded form a 3- to 7-membered ring;
Y_1 is oxygen or NR_{59};
R_{59} is hydrogen, C_1-C_6alkyl, C_3-C_6alkenyl, C_3-C_6alkynyl, C_1-C_4alkoxycarbonyl, benzyl or phenyl, wherein benzyl or phenyl may themselves be substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_1-C_6alkoxy, C_1-C_6-haloalkoxy, C_1-C_6alkylcarbonyl, C_1-C_6alkoxycarbonyl, amino, C_1-C_4alkylamino, C_1-C_4-dialkylamino, C_1-C_6alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_4alkylsulfonyloxy,
C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-$S(O)_2NH$, C_1-C_4alkyl-$S(O)_2N(C_1$-C_4alkyl), halogen, nitro, COOH or by cyano;
R_{55}, R_{56}, R_{57} and R_{58} are each independently of the others hydrogen, hydroxy-C_1-C_4alkyl, C_1-C_6alkyl, C_1-C_4alkoxy-C_1-C_4alkyl, C_2-C_6alkenyl, C_2-C_6alkynyl, C_1-C_6alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_4alkylaminosulfonyl, C_1-C_4haloalkyl, C_1-C_6alkylsulfonyloxy-C_1-C_4alkyl, phenylsulfonyloxy-C_1-C_4alkyl, C_1-C_6alkylamino, C_1-C_6-dialkylamino, C_1-C_6alkoxy or phenyl, wherein the phenyl group may itself be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4alkoxy-carbonyl, halogen, nitro, COOH or by cyano, or R_{55} and R_{56} together form a C_2-C_5alkylene chain, or R_{55} and R_{57} together form a chemical bond or a C_1-C_4alkylene chain, or R_{57} together with R_{59} forms a chemical bond or a C_3-C_4alkylene chain;
and to the agrochemically tolerable salts and all stereoisomers and tautomers of the compounds of formula I.

The alkyl groups mentioned in the substituent definitions may be straight-chain or branched and are, for example, methyl, ethyl, n-propyl, isopropyl, n-butyl, sec-butyl, isobutyl, tert-butyl, pentyl, hexyl, heptyl, octyl, nonyl, decyl, undecyl and dodecyl or branched isomers thereof. Alkoxy, alkenyl and alkynyl radicals are derived from the mentioned alkyl radicals. The alkenyl and alkynyl groups may be mono- or poly-unsaturated.

An alkylene group can be substituted by one or more methyl groups; such alkylene groups are preferably unsubstituted. The same applies also to all groups containing C_3-C_6-cycloalkyl, C_3-C_5oxacycloalkyl, C_3-C_5thiacycloalkyl, C_3-C_4dioxacycloalkyl, C_3-C_4dithia-cycloalkyl or C_3-C_4oxathiacycloalkyl.

Halogen is generally fluorine, chlorine, bromine or iodine, preferably fluorine or chlorine. The same is also true of halogen in conjunction with other definitions, such as haloalkyl or halophenyl.

Haloalkyl groups having a chain length of from 1 to 6 carbon atoms are, for example, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2,2,2-trifluoroethyl, 1-fluoroethyl, 2-fluoroethyl, 2-chloroethyl, 2-fluoro-prop-2-yl, pentafluoroethyl, 1,1-difluoro-2,2,2-trichloroethyl, 2,2,3,3-tetrafluoroethyl and 2,2,2-trichloroethyl, pentafluoroethyl, heptafluoro-n-propyl, perfluoro-n-hexyl; haloalkyl groups in the definitions R_2, R_3 and especially R_5 are preferably trichloromethyl, fluoromethyl, dichlorofluoromethyl, difluorochloromethyl, difluoromethyl, trifluoromethyl, pentafluoroethyl or heptafluoro-n-propyl.

As haloalkenyl there come into consideration alkenyl groups mono- or poly-substituted by halogen, wherein halogen is fluorine, chlorine, bromine or iodine and especially fluorine or chlorine, for example 1-chlorovinyl, 2-chlorovinyl, 2,2-difluorovinyl, 2,2-difluoroprop-1-en-2-yl, 2,2-dichlorovinyl, 3-fluoroprop-1-enyl, chloroprop-1-en-1-yl, 3-bromoprop-1-en-1-yl, 2,3,3-trifluoroprop-2-en-1-yl, 2,3,3-trichloroprop-2-en-1-yl and 4,4,4-trifluoro-but-2-en-1-yl. Of the C_2-C_6alkenyl groups mono-, di- or tri-substituted by halogen, preference is given to those having a chain length of from 2 to 5 carbon atoms.

As haloalkynyl there come into consideration, for example, alkynyl groups mono- or poly-substituted by halogen, wherein halogen is bromine, iodine and especially fluorine or chlorine, for example 3-fluoropropynyl, 3-chloropropynyl, 3-bromopropynyl, 3,3,3-trifluoropropynyl and 4,4,4-trifluoro-but-2-yn-1-yl. Of the alkynyl groups mono- or poly-substituted by halogen, preference is given to those having a chain length of from 2 to 5 carbon atoms.

A C_3-C_6cycloalkyl group mono- or poly-substituted by halogen is, for example, the 2,2-dichlorocyclopropyl, 2,2-dibromocyclopropyl, 2,2,3,3-tetrafluorocyclobutyl or 2,2-difluoro-3,3-dichlorocyclobutyl group.

Alkoxy groups preferably have a chain length of from 1 to 6 carbon atoms. Alkoxy is, for example, methoxy, ethoxy, propoxy, isopropoxy, n-butoxy, isobutoxy, sec-butoxy or tert-butoxy and the isomeric pentyloxy and hexyloxy groups; preferably methoxy or ethoxy. Alkylcarbonyl is preferably acetyl or propionyl. Alkoxycarbonyl is, for example, methoxy-

carbonyl, ethoxycarbonyl, propoxycarbonyl, isopropoxycarbonyl, n-butoxycarbonyl, isobutoxycarbonyl, sec-butoxycarbonyl or tert-butoxycarbonyl; preferably methoxycarbonyl, ethoxycarbonyl or tert-butoxycarbonyl. Haloalkoxy groups preferably have a chain length of from 1 to 6 carbon atoms.

Haloalkoxy is, for example, fluoromethoxy, difluoromethoxy, trifluoromethoxy, 2,2,2-trifluoroethoxy, 1,1,2,2-tetrafluoroethoxy, 1-fluoroethoxy, 2-fluoroethoxy, 2-chloroethoxy, 2,2-difluoroethoxy or 2,2,2-trichloroethoxy; preferably fluoromethoxy, difluoromethoxy, 2-chloroethoxy or trifluoromethoxy.

Alkylthio groups preferably have a chain length of from 1 to 8 carbon atoms.
Alkylthio is, for example, methylthio, ethylthio, propylthio, isopropylthio, n-butylthio, isobutylthio, sec-butylthio or tert-butylthio, preferably methylthio or ethylthio. Alkylsulfinyl is, for example, methylsulfinyl, ethylsulfinyl, propylsulfinyl, isopropylsulfinyl, n-butylsulfinyl, isobutylsulfinyl, sec-butylsulfinyl or tert-butylsulfinyl; preferably methylsulfinyl or ethylsulfinyl.

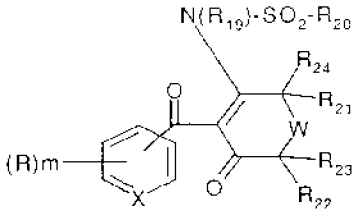
Alkylsulfonyl is, for example, methylsulfonyl, ethylsulfonyl, propylsulfonyl, isopropylsulfonyl, n-butylsulfonyl, isobutylsulfonyl, sec-butylsulfonyl or tert-butylsulfonyl; preferably methylsulfonyl or ethylsulfonyl.
Alkylamino is, for example, methylamino, ethylamino, n-propylamino, isopropylamino or the isomeric butylamines. Dialkylamino is, for example, dimethylamino, methylethylamino, diethylamino, n-propylmethylamino, dibutylamino or diisopropylamino. Preference is given to alkylamino groups having a chain length of from 1 to 4 carbon atoms. Alkoxyalkyl groups preferably have from 1 to 6 carbon atoms. Alkoxyalkyl is, for example, methoxymethyl, methoxyethyl, ethoxymethyl, ethoxyethyl, n-propoxymethyl, n-propoxyethyl, isopropoxymethyl or isopropoxyethyl. Alkylthioalkyl groups preferably have from 1 to 6 carbon atoms. Alkylthioalkyl is, for example, methylthiomethyl, methylthioethyl, ethylthiomethyl, ethylthioethyl, n-propylthiomethyl, n-propylthioethyl, isopropylthiomethyl, isopropylthioethyl, butylthiomethyl, butylthioethyl or butylthiobutyl.

Phenyl, also as part of a substituent, such as phenoxy, benzyl, benzyloxy, benzoyl, phenylthio, phenylalkyl, phenoxyalkyl or tosyl, can be mono- or poly-substituted. The substituents can in that case be in the ortho-, meta- and/or para-position(s) as desired.

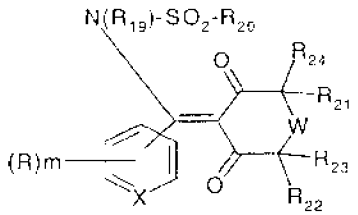
Allenyl is, for example, CH_2=C=CH_2 , CH_2=CH-CH_2-CH=CH_2 , CH_2=CH-CH_2-CH_2-CH=CH_2 or CH_2=CH-CH_2-CH=CH-CH_3.

The invention also includes the salts that can be formed by the compounds of formula I, preferably with amines, alkali metal and alkaline earth metal bases or quaternary ammonium bases. Among the alkali metal bases and alkaline earth metal bases as salt formers, emphasis is given to the hydroxides of lithium, sodium, potassium, magnesium or calcium, especially those of sodium or potassium. Examples of amines suitable for ammonium salt formation include ammonia and also primary, secondary and tertiary C_1-C_{18}alkylamines, C_1-C_4hydroxyalkylamines and C_2-C_4alkoxyalkylamines, for example methylamine, ethylamine, n-propylamine, isopropylamine, the four isomeric butylamines, n-amylamine, isoamylamine, hexylamine, heptylamine, octylamine, nonylamine, decylamine, pentadecylamine, hexadecylamine, heptadecylamine, octadecylamine, methylethylamine, methylisopropylamine, methylhexylamine, methylnonylamine, methylpentadecylamine, methyloctadecylamine, ethylbutylamine, ethylheptylamine, ethyloctylamine, hexylheptylamine, hexyloctylamine, dimethylamine, diethylamine, di-n-propylamine, diisopropylamine, di-n-butylamine, di-n-amylamine, di-iso-amylamine, dihexylamine, diheptylamine, dioctylamine, ethanolamine, n-propanolamine, isopropanolamine, N,N-diethanolamine, N-ethylpropanolamine, N-butylethanolamine, allylamine, n-butenyl-2-amine, n-pentenyl-2-amine, 2,3-dimethylbutenyl-2-amine, di-butenyl-2-amine, n-hexenyl-2-amine, propylenediamine, trimethylamine, triethylamine, tri-n-propylamine, triisopropylamine, tri-n-butylamine, triisobutylamine, tri-sec-butylamine, tri-n-amylamine, methoxyethylamine and ethoxyethylamine; heterocyclic amines, for example pyridine, quinoline, isoquinoline, morpholine, piperidine, pyrrolidine, indoline, quinuclidine and azepine; primary arylamines, for example anilines, methoxyanilines, ethoxyanilines, o-, m- and p-toluidines, phenylenediamines, naphthylamines and o-, m- and p-chloroanilines; but especially triethylamine, isopropylamine and diisopropylamine. Quaternary ammonium bases suitable for salt formation are, for example, $[N(R_a R_b R_c R_d)]^+ OH^-$, wherein R_a, R_b, R_c and R_d are each independently of the others C_1-C_4alkyl. Further suitable tetraalkylammonium bases containing other anions can be obtained, for example, by anion exchange reactions. M^+ is preferably an ammonium salt, especially NH_4^+ or an alkali metal, especially potassium or sodium.

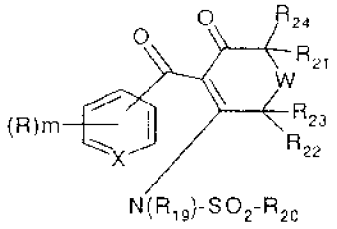
The compounds of formula I may occur in various tautomeric forms, such as, for example, when Q is Q_1, formulae Ia , Ib and Ic, with the forms Ia and Ic being preferred:



Ia



Ib



Ic

The present invention includes also all those stereoisomeric forms of the compound of formula I.

Of the compounds of formula I, special preference is given to those groups wherein:

a) R_{19}, R_{34}, R_{46} and R_{60} are hydrogen; R_{20}, R_{35}, R_{61} and R_{47} are each independently of the others C_1-C_4alkyl, C_1-C_4haloalkyl, preferably trifluoromethyl, C_3-C_4alkenyl, C_3-C_4haloalkenyl, benzyl or phenyl;
wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3-haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{20}, R_{35}, R_{61} and R_{47} are hydroxy-C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkyl-sulfinyl-C_1-C_{12}alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_6alkylcarbonyl-oxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_6oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl, $NR_{32}R_{33}$, $NR_{51}R_{52}$, $NR_{53}R_{54}$, $NR_{55}R_{56}$ or formyl-C_1-C_{12}alkyl;
or R_{20}, R_{35}, R_{61} and R_{47} are a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di-or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_1-C_6alkoxy, C_1-C_6alkyl-thio, C_1-C_6haloalkylthio, C_3-C_5alkenylthio, C_3-C_5haloalkenylthio, C_1-C_6alkylsulfinyl, C_1-C_6-haloalkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkylsulfonyl, halogen, cyano, nitro, phenylthio and/or by benzylthio, and wherein the substituents at the nitrogen atom in the heterocyclic ring are free of halogen;
R_{32}, R_{51}, R_{53} and R_{62} are each independently of the others C_1-C_{12}alkyl and

R_{33}, R_{52}, R_{54} and R_{63} are each independently of the others C_1-C_{12}alkyl, or R_{32} and R_{33}, or R_{51} and R_{52}, or R_{53} and R_{54}, or R_{62} and R_{63}, together with the nitrogen atom to which they are bonded, form a 3- to 7 membered ring;

b) Q is the group Q_1; wherein W is -$CR_{25}R_{26}$- or oxygen and R_{25} and R_{26} are each independently of the other hydrogen, methyl or ethyl;
R_{21}, R_{22}, R_{23} and R_{24} are each independently of the others hydrogen, methyl, ethyl or trifluoromethyl; or a maximum of one substituent selected from R_{21}, R_{22}, R_{23} and R_{24} is methoxycarbonyl, ethoxycarbonyl, methylthio, methylsulfinyl or methylsulfonyl; or W is -C(O)- and R_{21}, R_{22}, R_{23} and R_{24} are each independently of the others methyl or ethyl;

c) Q is the group Q_2; wherein Y is a methylene group, an ethylene group, carbonyl or oxygen and A is a methylene group or an ethylene group;
R_{36} is hydrogen or methyl; and R_{37}, R_{38} and R_{39} are each independently of the others hydrogen or methyl;

d) Q is the group Q_4; wherein Y is NR_{59}; R_{59} is methyl or ethyl;
R_{55}, R_{56}, R_{57} and R_{58} are each independently of the others hydrogen, methyl or ethyl; or R_{55} and R_{57} together form a chemical bond or a methylene bridge;

e) Q is the group Q_3; wherein R_{48} and R_{49} are each independently of the other methyl or ethyl, and R_{50} is methyl or ethyl;

f) X is methine, wherein the phenyl ring containing the substituent X is substituted in the 2-position relative to the substituent –C(O)-Q by methyl, ethyl, halomethyl, chlorine, bromine, nitro or by methylsulfonyl, and in the 4-position relative to the substituent –C(O)-Q by halomethyl, chlorine, bromine, nitro, methylthio, methylsulfinyl, methylsulfonyl, methylsulfonyloxy, dimethylaminosulfonyl, methylsulfonylamino or by halomethylsulfonylamino, and may contain a further substituent in the 3-position relative to the substituent –C(O)-Q;

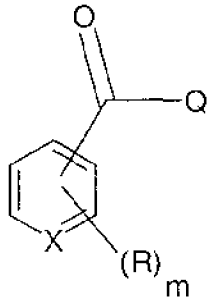
g) X is nitrogen; the group –C(O)-Q is preferably in the 3-position relative thereto, and the ring carrying the substitutent X is substituted in the 2-position by methyl, ethyl, n-propyl, halomethyl, methoxymethyl, ethoxymethyl, methylthiomethyl, methylsulfinyl or by methyl-

sulfonyl; and in the 6-position by halomethyl, chlorine, bromine, methylthio, methylsulfinyl or by methylsulfonyl;

h) X is methine, and the phenyl ring is substituted in the 4-position relative to the substituent –C(O)-Q by halomethyl, chlorine, bromine, nitro, methylthiomethyl, methylsulfinylmethyl, methylsulfonyl, methylsulfonyloxy, methylsulfonylamino or by halomethylsulfonylamino, and in the 2,3-position relative to the substituent –C(O)-Q by a fused ring system, such as, preferably, by groups $-S(O)_nCH_2CH_2-$, $-S(O)_nCH(CH_3)CH_2-$, $-SO_2N(CH_3)C(O)-$, $-CH_2CH_2O-$, $-CH_2CH(CH_3)O-$, $-CH_2CH_2CH_2O-$, $-CH_2CH_2CH(CH_3)O-$ or $-CH_2CH(CH_2OCH_3)O-$, wherein n is 0, 1 or 2; and

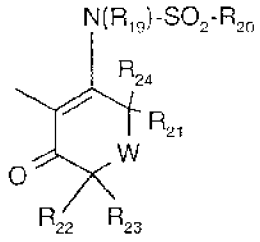
i) X is methine, and the phenyl ring is substituted in the 2-position relative to the substituent –C(O)-Q by methyl, halomethyl, chlorine or by bromine, and in the 3,4-position relative to the substituent –C(O)-Q by a fused ring system, such as preferably by the groups $-S(O)_nCH_2CH_2-$, $-S(O)_nCH(CH_3)CH_2-$, $-CH_2CH_2CH_2S(O)_n$, $-CH(CH_3)CH_2CH_2S(O)_n-$, $-CH(OCH_3)CH_2CH_2S(O)_n-$, $-C(O)CH_2CH_2S(O)_n-$, $-C(OCH_3)_2CH_2CH_2S(O)_n-$, $-C(NOH)CH_2CH_2S(O)_n-$, $-C(NOCH_3)CH_2CH_2S(O)_n-$ or $-SO_2N(CH_3)C(O)-$, wherein n is 0, 1 or 2.

In the process according to the invention for the preparation of compounds of formula I

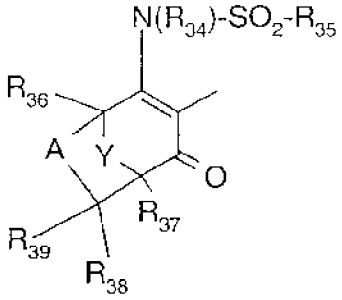


(I),

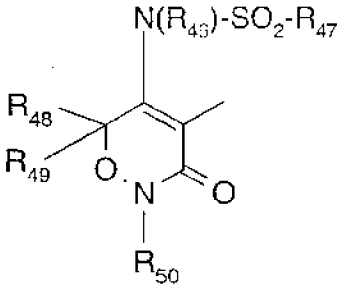
wherein R, m and X are as defined for formula I and Q is a group



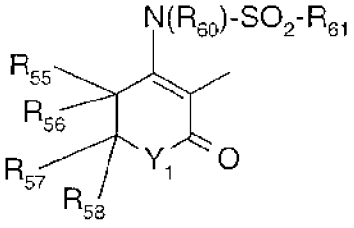
(Q1),



(Q2),



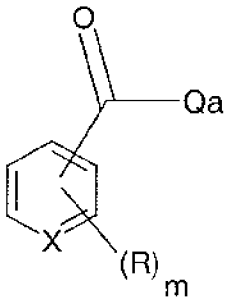
(Q3) or



(Q4);

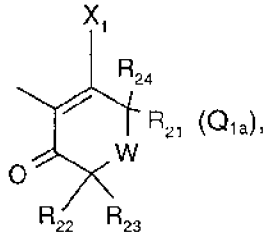
either

a) a compound of formula II

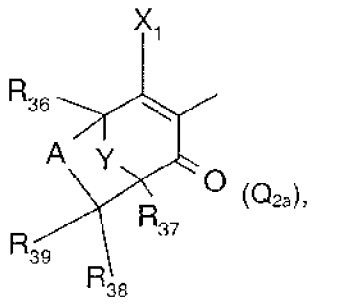


(II),

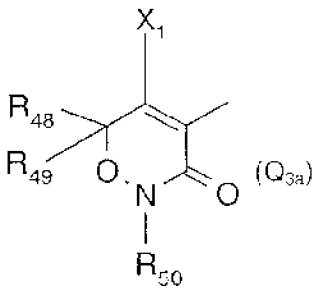
wherein R, m and X are as defined for formula I and Qa is a group



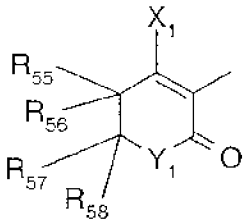
(Q1a),



(Q2a),



(Q_{3a}) or



(Q_{4a});

wherein X_1 is a leaving group, for example halogen, is reacted in a polar aprotic solvent, such as acetonitrile, dimethylformamide or sulfolan, with a compound of formula

M-N(R_{19})SO_2R_{20} (IIIa, when Qa is Q_1a), or

M-N(R_{34})SO_2R_{35} (IIIb, when Qa is Q_2a), or

M-N(R_{46})SO_2R_{47} (IIIc, when Qa is Q_3a), or

M-N(R_{60})SO_2R_{61} (IIId, when Qa is Q_4a),

wherein M is lithium, sodium, potassium, magnesium or calcium, especially sodium or potassium; R_{19}, R_{34}, R_{46} and R_{60} are each independently of the others hydrogen or C_1-C_6-alkyl; and R_{20}, R_{35}, R_{47} and R_{61} are each independently of the others C_1-C_{12}alkyl, C_1-C_{12}-haloalkyl, C_2-C_{12}alkenyl, C_2-C_6haloalkenyl, C_1-C_2alkoxycarbonyl- or phenyl-substituted vinyl, or is C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6allenyl, C_3-C_6cycloalkyl, $NR_{32}R_{33}$, $NR_{51}R_{52}$, $NR_{53}R_{54}$, $NR_{62}R_{63}$, benzyl or phenyl,

wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3-haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{20}, R_{35}, R_{61} and R_{47} are hydroxy-C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkyl-sulfinyl-C_1-C_{12}alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_6alkylcarbonyl-oxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_6oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl or formyl-C_1-C_{12}alkyl;

or R_{20}, R_{35}, R_{61} and R_{47} are a five-to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, the ring system being bonded to the sulfur atom of the –N(R_{19})–S(O)$_2$-, –N(R_{34})–S(O)$_2$-, –N(R_{46})–S(O)$_2$- or –N(R_{60})–S(O)$_2$- group by way of a C_1-C_{12}alkylene group, and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_2-C_6alkynyl,

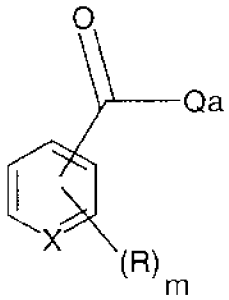
C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6haloalkenylthio, C_3-C_6-alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxycarbonylalkylthio, C_2-C_4-cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkyl-sulfonyl, aminosulfonyl, C_1-C_2alkylaminosulfonyl, di(C_1-C_2-alkyl)aminosulfonyl, di(C_1-C_4-alkyl)amino, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents on the nitrogen atom in the heterocyclic ring are other than halogen,

R_{32}, R_{51}, R_{53} and R_{62} are each independently of the others C_1-C_{12}alkyl and

R_{33}, R_{52}, R_{54} and R_{63} are each independently of the others C_1-C_{12}alkyl, or R_{32} and R_{33}, or R_{51} and R_{52}, or R_{53} and R_{54}, or R_{62} and R_{63}, together with the nitrogen atom to which they are bonded, form a 3- to 7-membered ring,

or

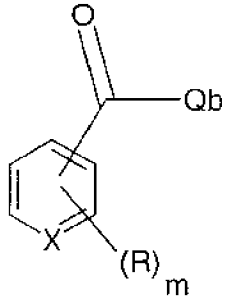
b) in a compound of formula II



(II)

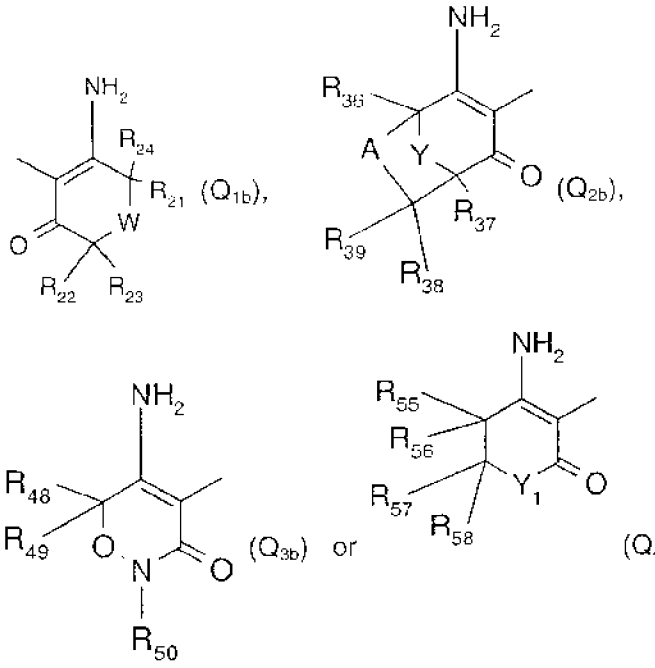
wherein X, R, m and Qa are as defined above,

using ammonia in an organic solvent, such as, for example, a halogenated hydrocarbon, for example dichloromethane, or an ether, for example tetrahydrofuran, or in a polar aprotic solvent, such as dimethylformamide or sulfolan, the leaving group X_1 is replaced by the amino group, the resulting compound of formula IV



(IV),

wherein R, m and X are as defined for formula I and Qb is a group



is reacted, in the presence of a suitable base, such as lithium diisopropylamide, sodium hydride or sodium bistrimethylsilylamide, at temperatures of from 100 °C to –20°C (preferably from 0 to 50°C) in an ether, for example tetrahydrofuran, or in a polar aprotic solvent, such as dimethylformamide or sulfolan, to form the corresponding anion, and the latter is then reacted with a compound of formula

$(X_2)SO_2R_{20}$ (Va, when Q is Q_1b), or

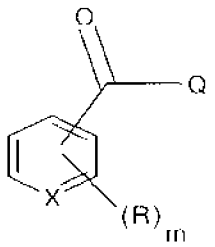
$(X_2)SO_2R_{35}$ (Vb), when Q is Q_2b), or

$(X_2)SO_2R_{47}$ (Vc, when Q is Q_3b), or

$(X_2)SO_2R_{61}$ (Vd, when Q is Q_4b),

wherein X_2 is a leaving group, for example halogen, and R_{20}, R_{35}, R_{47} and R_{61} are as defined above.

The resulting compound of formula I

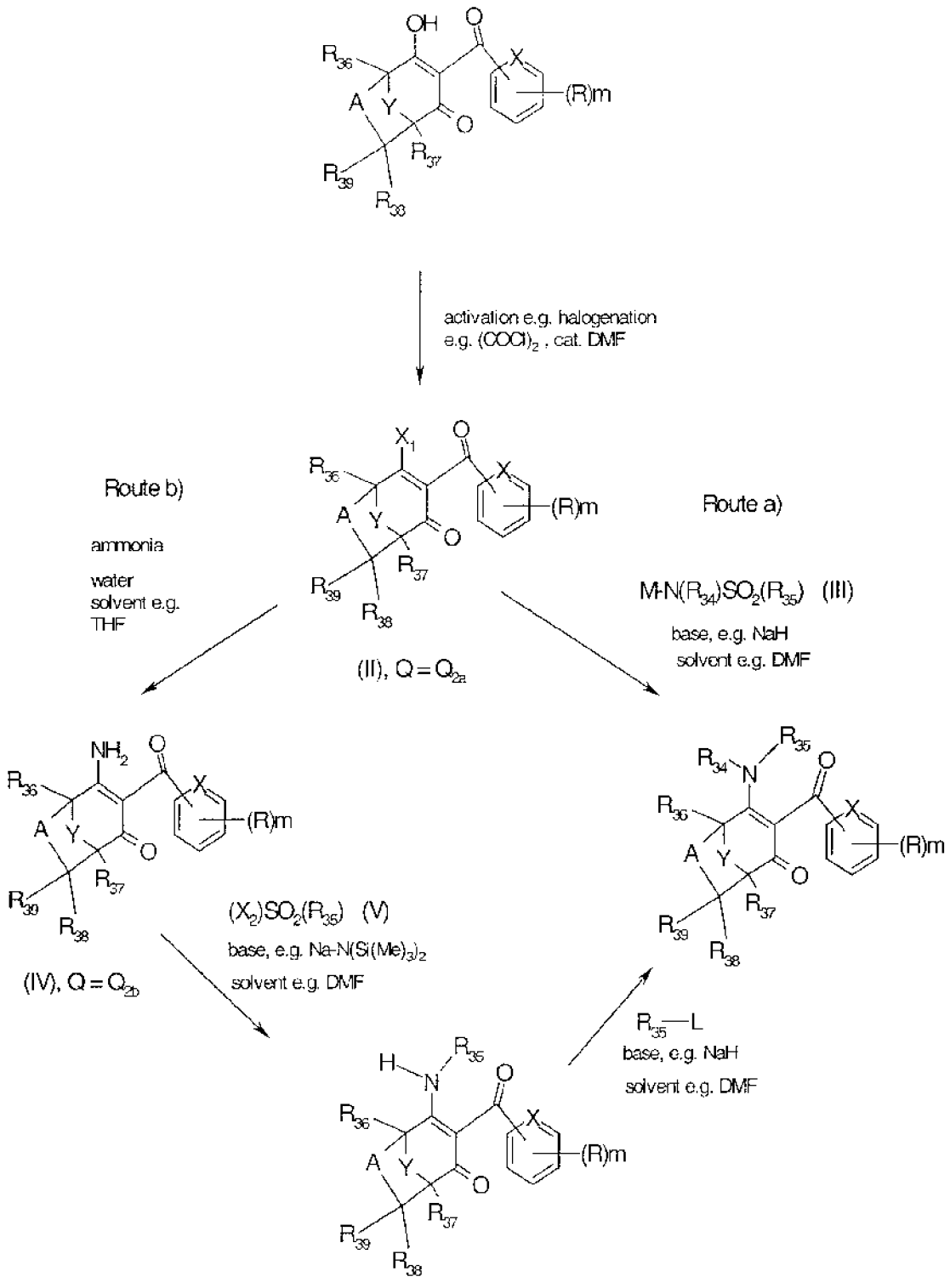


(I),

wherein R, m, Q and X are as defined above for formula I and R_{19}, R_{34}, R_{46} and R_{60} are hydrogen, can be converted by alkylation in a suitable solvent with an alkylating agent L-C_1-C_6alkyl, wherein L is a leaving group, such as chlorine, bromine, iodine, mesyloxy or tosyloxy, in the presence of a base, for example sodium hydride, into compounds of formula I wherein R_{19}, R_{34}, R_{46} and R_{60} are C_1-C_6alkyl.

Those reaction sequences, Routes a) and b), are described in more detail by way of the following Example (Q, Q_2):

Scheme 1.


activation e.g. halogenation
e.g. (COCl)2 , cat. DMF
Route b)
ammonia
water
solvent e.g.
THF
Route a)
M-N(R34)SO2(R35) (III)
base, e.g. NaH
solvent e.g. DMF
(II), Q = Q2a
(IV), Q = Q2b
(X2)SO2(R35) (V)
base, e.g. Na-N(Si(Me)3)2
solvent e.g. DMF
R35—L
base, e.g. NaH
solvent e.g. DMF

The compounds of formulae II and IV can be prepared by way of processes known *per se*, e.g. processes described in EP-A-0 249 813, WO 00/15615 and WO 00/39094.
According to reaction scheme 1, the compounds of formula II wherein X_1 is as defined above are prepared by way of the corresponding hydroxy compounds, for example by using a halogenating agent, e.g. a thionyl halide, for example thionyl chloride or bromide; a phosphorus halide or a phosphorus oxyhalide, for example phosphorus pentachloride or phosphorus oxychloride or phosphorus pentabromide or phosphoryl bromide; or an oxalyl halide, for example oxalyl chloride, or by using a reagent for the formation of an activated ester, such as N,N'-dicyclohexylcarbodiimide (DCC) or N-ethyl-N'-(3-dimethylaminopropyl)-carbodiimide (EDC).
The reaction is preferably carried out in an inert, organic solvent, such as in an aliphatic, halogenated aliphatic, aromatic or halogenated aromatic hydrocarbon, for example n-hexane, benzene, toluene, xylenes, dichloromethane, 1,2-dichloroethane or chlorobenzene, at reaction temperatures in the range of from -20°C to the reflux temperature of the reaction mixture, preferably at 40-150°C, and in the presence of a catalytic amount of N,N-dimethyl-formamide. Such reactions are generally known and are described in the literature with a number of variations for the leaving group X_1 (or X_2).
The end products of formula I can be isolated in customary manner by concentration or evaporation of the solvent, and can be purified by recrystallisation or trituration of the solid residue in solvents in which they are not readily soluble, such as ethers, aromatic hydrocarbons or chlorinated hydrocarbons, by distillation or by column chromatography using a suitable eluant.

The person skilled in the art will also be familiar with the order in which it is expedient to carry out certain reactions in order to avoid any possible secondary reactions.
Where the synthesis is not targeted at the isolation of pure isomers, the product can be in the form of a mixture of two or more isomers. The isomers can be separated according to methods known *per se*.

Compounds of formula I wherein X is N=O can be prepared by reacting a compound of formula I wherein X is nitrogen with a suitable oxidising agent, such as with the adduct of H_2O_2 and urea, in the presence of an acid anhydride, for example trifluoroacetic anhydride.

The reactions to form compounds of formula I are advantageously carried out in aprotic, inert organic solvents. Such solvents are hydrocarbons, such as benzene, toluene, xylene and cyclohexane, chlorinated hydrocarbons, such as dichloromethane, trichloromethane, tetrachloromethane and chlorobenzene, ethers such as diethyl ether, ethylene glycol dimethyl ether, diethylene glycol dimethyl ether, tetrahydrofuran and dioxane, nitriles, such as acetonitrile and propionitrile, amides, such as N,N-dimethylformamide, diethylformamide and N-methylpyrrolidinone. The reaction temperatures are preferably from -20°C to +120°C. The reactions are generally slightly exothermic and can generally be carried out at room temperature. In order to shorten the reaction time or in order to initiate the reaction, it is also possible to heat the reaction mixture for a short time up to its boiling point. The reaction times can also be shortened by the addition of a few drops of a base as reaction catalyst. Suitable bases are especially tertiary amines, such as trimethylamine, triethylamine, quinuclidine, 1,4-diazabicyclo[2.2.2]octane, 1,5-diazabicyclo[4.3.0]non-5-ene or 1,5-diazabicyclo[5.4.0]undec-7-ene but as bases it is also possible to use inorganic bases, such as hydrides, such as sodium or calcium hydride, hydroxides, such as sodium or potassium hydroxide, carbonates, such as sodium or potassium carbonate, or hydrogen carbonates, such as potassium or sodium hydrogen carbonate.
The compounds of formula I can be isolated in customary manner by concentration and/or evaporation of the solvent, and can be purified by recrystallisation or trituration of the solid residue in solvents in which they are not readily soluble, such as ethers, aromatic hydrocarbons or chlorinated hydrocarbons.

For the use according to the invention of the compounds of formula I or of compositions comprising them there is suitable any method of application customary in agriculture, such as pre-emergence application, post-emergence application and seed dressing, as well as various methods and techniques, such as the controlled release of active ingredient. In that method, the compound is applied in solution to mineral granule carriers or polymerised granules (urea/formaldehyde) and dried. Where appropriate, it is also possible to apply a coating (coated granules), which allows the active ingredient to be released in metered amounts over a specific period.

The compounds of formula I can be used as herbicides in unmodifed form, i.e. as obtained during synthesis, but are preferably formulated in customary manner together with the adjuvants conventionally employed in formulation technology, e.g. into emulsifiable

concentrates, directly sprayable or dilutable solutions, dilute emulsions, wettable powders, soluble powders, dusts, granules and microcapsules. Such formulations are described, for example, in WO 97/34485 on pages 9 to 13. As with the nature of the compositions, the methods of application, such as spraying, atomising, dusting, wetting, scattering or pouring, are chosen in accordance with the intended objectives and the prevailing circumstances.

The formulations, i.e. the compositions, preparation or mixtures comprising the compound (active ingredient) of formula I or at least one compound of formula I and generally one or more solid or liquid formulation adjuvant(s), are prepared in known manner, e.g. by intimately mixing and/or grinding the active ingredients with the formulation adjuvants, e.g. solvents or solid carriers. Surface-active compounds (surfactants) may additionally be used in the preparation of the formulations. Examples of solvents and solid carriers are given, for example, in WO 97/34485 on page 6.

Depending upon the nature of the compound of formula I to be formulated, suitable surface-active compounds are non-ionic, cationic and/or anionic surfactants and surfactant mixtures having good emulsifying, dispersing and wetting properties.

Examples of suitable anionic, non-ionic and cationic surfactants are listed, for example, in WO 97/34485 on pages 7 and 8.

Also suitable for the preparation of the herbicidal compositions according to the invention are the surfactants conventionally employed in formulation technology described *inter alia* in "Mc Cutcheon's Detergents and Emulsifiers Annual" MC Publishing Corp., Ridgewood New Jersey, 1981, Stache, H., "Tensid-Taschenbuch", Carl Hanser Verlag, Munich/Vienna, 1981 and M. and J. Ash, "Encyclopedia of Surfactants", Vol I-III, Chemical Publishing Co., New York, 1980-81.

The herbicidal formulations generally contain from 0.1 to 99 % by weight, especially from 0.1 to 95 % by weight, of herbicide, from 1 to 99.9 % by weight, especially from 5 to 99.8 % by weight, of a solid or liquid formulation adjuvant and from 0 to 25 % by weight, especially from 0.1 to 25 % by weight, of a surfactant. Whereas commercial products will preferably be formulated as concentrates, the end user will normally employ dilute formulations. The compositions may also comprise further auxiliaries, such as stabilisers, e.g. vegetable oils or

epoxidised vegetable oils (epoxidised coconut oil, rape oil or soybean oil), antifoams, for example silicone oil, preservatives, viscosity regulators, binders and tackifiers, as well as fertilisers or other active ingredients.

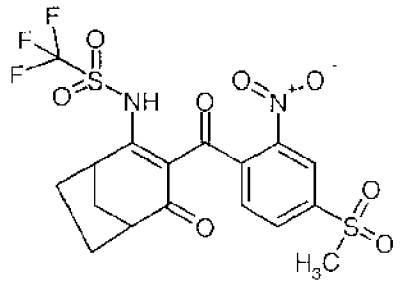
The compounds of formula I are generally applied to the plants or to their locus in rates of application of from 0.001 to 4 kg/ha, especially from 0.005 to 2 kg/ha. The concentration required to achieve the desired effect can be determined by experimentation. It is dependent upon the type of action, the stage of development of the crop plant and of the weed, and also upon the application (place, time, method) and, in dependence upon those parameters, can vary within wide limits.

The compounds of formula I are distinguished by herbicidal and growth-inhibiting properties which enable them to be used in crops of useful plants, especially in cereals, cotton, soybeans, sugar beet, sugar cane, plantation crops, rape, maize and rice, and in non-selective weed control. Crops are also to be understood as including those which have been rendered tolerant to herbicides or classes of herbicide by conventional methods of breeding or genetic engineering. The weeds to be controlled may be either monocotyledonous or dicotyledonous weeds, for example Stellaria, Nasturtium, Agrostis, Digitaria, Avena, Setaria, Sinapis, Lolium, Solanum, Echinochloa, Scirpus, Monochoria, Sagittaria, Bromus, Alopecurus, Sorghum halepense, Rottboellia, Cyperus, Abutilon, Sida, Xanthium, Amaranthus, Chenopodium, Ipomoea, Chrysanthemum, Galium, Viola and Veronica.

The following Examples illustrate the invention further but do not limit the invention.

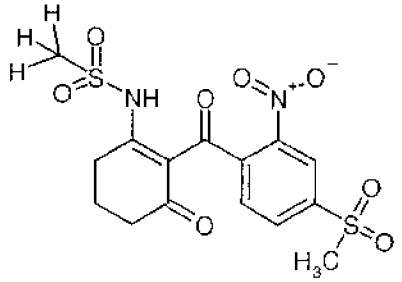
Preparation Examples:

Example P1: Preparation of C,C,C-trifluoro-N-[3-(4-methanesulfonyl-2-nitro-benzoyl)-4-oxo-bicyclo[3.2.1]oct-2-en-2-yl]-methanesulfonamide:



0.25 g (1.8 mmol) of trifluoromethylsulfonamide is added to a 55 % dispersion of 0.16 g (3.6 mmol) of sodium hydride in oil in 5 ml of anhydrous N-methylpyrrolidone, and the mixture is heated to a temperature of 50°C. Once the evolution of hydrogen has ceased, 0.64 g (1.6 mmol) of 4-chloro-3-(4-methanesulfonyl-2-nitro-benzoyl)-bicyclo[3.2.1]oct-3-en-2-one (e.g. known from JP 06025144 A2) is added in portions and the mixture is stirred for one hour at a temperature of 50°C. The reaction mixture is then acidified with 0.5N hydrochloric acid and subsequently extracted with ethyl acetate in the presence of a small amount of sodium chloride solution. The product, which is dried over sodium sulfate and concentrated by evaporation, is recrystallised from a 1:1 mixture of dichloromethane and hexane to yield the pure C,C,C-trifluoro-N-[3-(4-methanesulfonyl-2-nitro-benzoyl)-4-oxo-bicyclo[3.2.1]oct-2-en-2-yl]-methanesulfonamide having a melting point of 178-180°C.

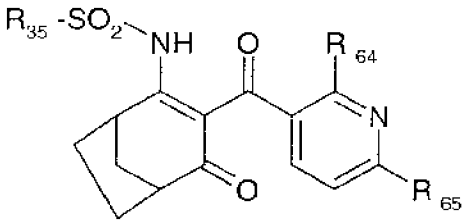
Example P2: Preparation of N-[2-(4-methanesulfonyl-2-nitro-benzoyl)-3-oxo-cyclohex-1-enyl]-methanesulfonamide:



1 g (2.96 mmol) of 3-amino-2-(4-methanesulfonyl-2-nitro-benzoyl)-cyclohex-2-enone (m.p. 137-138°C, prepared by treatment of 3-chloro-2-(4-methanesulfonyl-2-nitro-benzoyl)-cyclohex-2-enone (m.p. 149-150°C, prepared analogously to DE-A-42 41 999) with 25%

ammonia solution at room temperature in tetrahydrofuran) is placed in 10 ml of anhydrous dimethylformamide. 0.81 g (4.43 mmol) of sodium bistrimethylsilylamide is then added in portions. After stirring for 30 minutes, 0.28 ml (3.55 mmol) of methanesulfonyl chloride is added dropwise and the mixture is stirred for a further 8 hours. The reaction mixture is then poured into ethyl acetate and 1N hydrochloric acid, and the organic phase is separated off, washed with water, dried over sodium sulfate and concentrated by evaporation. The residue that remains behind is chromatographed on silica gel using a mixture of toluene, ethyl alcohol, dioxane, triethylamine and water (100:40:20:20:5 parts by volume) as eluant. The resulting oil is dissolved in ethyl acetate and washed in succession with 10 % hydrochloric acid and water. Concentration of the dried organic solution by evaporation yields pure N-[2-(4-methanesulfonyl-2-nitro-benzoyl)-3-oxo-cyclohex-1-enyl]-methane-sulfonamide in the form of crystals having a melting point of 191-192°C.

Table 1: Compounds of formula Id:

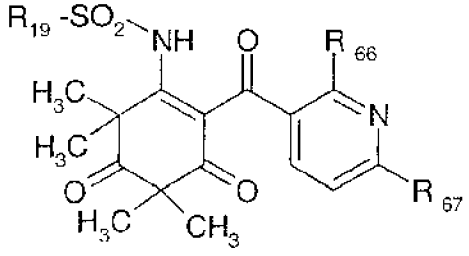


(Id)

No.	R_{35}	R_{64}	R_{65}	physical data
1.1	CH_2-CH=CH_2	CH_3	CF_3	-
1.2	CH_2-CH=CH_2	CH_3	CHF_2	-
1.3	CH_2-CH=CH_2	CH_3	CF_2Cl	-
1.4	CH_2-CH=CH_2	CH_2OCH_3	CF_3	-
1.5	CH_2-CH=CH_2	CH_2OCH_3	CHF_2	-
1.6	CH_2-CH=CH_2	CH_2OCH_3	CF_2Cl	-
1.7	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_3	-
1.8	CH_2-CH=CH_2	$CH_2OC_2H_5$	CHF_2	-
1.9	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_2Cl	-

No.	R_{35}	R_{64}	R_{65}	physical data
1.10	$(CH_2)_4$-CH_3	CH_3	CF_3	-
1.11	$(CH_2)_4$-CH_3	CH_3	CHF_2	-
1.12	$(CH_2)_4$-CH_3	CH_3	CF_2Cl	-
1.13	CH_2-$C(CH_3)$=CH_2	CH_2OCH_3	CF_3	-
1.14	CH_2-$C(CH_3)$=CH_2	CH_2OCH_3	CHF_2	-
1.15	CH_2-$C(CH_3)$=CH_2	CH_2OCH_3	CF_2Cl	-
1.16	CH_2-$C(CH_3)$=CH_2	$CH_2OC_2H_5$	CF_3	-
1.17	CH_2-$C(CH_3)$=CH_2	$CH_2OC_2H_5$	CHF_2	-
1.18	CH_2-$C(CH_3)$=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
1.19	CH_2-$C(CH_3)$=CH_2	CH_3	CF_3	
1.20	CH_2-$C(CH_3)$=CH_2	CH_3	CHF_2	
1.21	CH_2-$C(CH_3)$=CH_2	CH_3	CF_2Cl	
1.22	CH_2-CH=CHCl	CH_3	CF_3	-
1.23	CH_2-CH=CHCl	CH_3	CHF_2	-
1.24	CH_2-CH=CHCl	CH_3	CF_2Cl	-

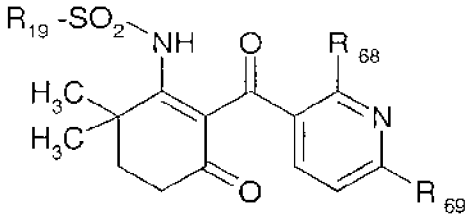
Table 2: Compounds of formula Ie:



(Ie)

No.	R_{19}	R_{66}	R_{67}	physical data
2.1	CH_2-CH=CH_2	CH_3	CF_3	-
2.2	CH_2-CH=CH_2	CH_3	CHF_2	-
2.3	CH_2-CH=CH_2	CH_3	CF_2Cl	-
2.4	CH_2-CH=CH_2	CH_2OCH_3	CF_3	-
2.5	CH_2-CH=CH_2	CH_2OCH_3	CHF_2	-
2.6	CH_2-CH=CH_2	CH_2OCH_3	CF_2Cl	-
2.7	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_3	-
2.8	CH_2-CH=CH_2	$CH_2OC_2H_5$	CHF_2	-
2.9	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
2.10	CH_3	CF_3	CH_3	-
2.11	CH_3	CH_3	SO_2CH_3	-
2.12	CH_3	CF_3	Cl	-
2.13	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CF_3	resin
2.14	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CHF_2	-
2.15	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CF_2Cl	-
2.16	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CF_3	-
2.17	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CHF_2	-
2.18	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
2.19	CH_2-C(CH_3)=CH_2	CH_3	CF_3	resin
2.20	CH_2-C(CH_3)=CH_2	CH_3	CHF_2	-
2.21	CH_2-C(CH_3)=CH_2	CH_3	CF_2Cl	-
2.22	CH_2-CH=CHCl	CH_3	CF_3	-
2.23	CH_2-CH=CHCl	CH_3	CHF_2	-
2.24	CH_2-CH=CHCl	CH_3	CF_2Cl	-

Table 3: Compounds of formula If:

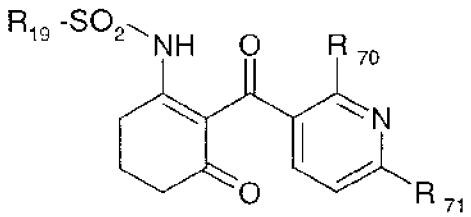


(If)

No.	R_{19}	R_{68}	R_{69}	physical data
3.1	CH_2-CH=CH_2	CH_3	CF_3	-
3.2	CH_2-CH=CH_2	CH_3	CHF_2	-
3.3	CH_2-CH=CH_2	CH_3	CF_2Cl	-
3.4	CH_2-CH=CH_2	CH_2OCH_3	CF_3	-
3.5	CH_2-CH=CH_2	CH_2OCH_3	CHF_2	-
3.6	CH_2-CH=CH_2	CH_2OCH_3	CF_2Cl	-
3.7	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_3	-
3.8	CH_2-CH=CH_2	$CH_2OC_2H_5$	CHF_2	-
3.9	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
3.10	CH_3	CF_3	CH_3	-
3.11	CH_3	CF_3	SO_2CH_3	-
3.12	CH_3	CF_3	Cl	-
3.13	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CF_3	-
3.14	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CHF_2	-
3.15	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CF_2Cl	-
3.16	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CF_3	-
3.17	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CHF_2	-
3.18	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
3.19	CH_2-C(CH_3)=CH_2	CH_3	CF_3	

No.	R_{19}	R_{68}	R_{69}	physical data
3.20	CH_2-C(CH_3)=CH_2	CH_3	CHF_2	
3.21	CH_2-C(CH_3)=CH_2	CH_3	CF_2Cl	
3.22	CH_2-CH=CHCl	CH_3	CF_3	-
3.23	CH_2-CH=CHCl	CH_3	CHF_2	-
3.24	CH_2-CH=CHCl	CH_3	CF_2Cl	-

Table 4: Compounds of formula Ig:

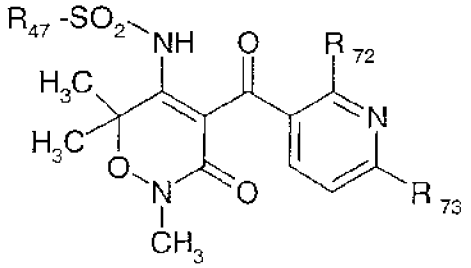


(Ig)

No.	R_{19}	R_{70}	R_{71}	physical data
4.1	CH_2-CH=CH_2	CH_3	CF_3	-
4.2	CH_2-CH=CH_2	CH_3	CHF_2	-
4.3	CH_2-CH=CH_2	CH_3	CF_2Cl	-
4.4	CH_2-CH=CH_2	CH_2OCH_3	CF_3	-
4.5	CH_2-CH=CH_2	CH_2OCH_3	CHF_2	-
4.6	CH_2-CH=CH_2	CH_2OCH_3	CF_2Cl	-
4.7	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_3	-
4.8	CH_2-CH=CH_2	$CH_2OC_2H_5$	CHF_2	-
4.9	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
4.10	CH_3	CF_3	CH_3	-

No.	R_{19}	R_{70}	R_{71}	physical data
4.11	CH_3	CF_3	OCH_3	-
4.12	CH_3	CF_3	Cl	-
4.13	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CF_3	-
4.14	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CHF_2	-
4.15	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CF_2Cl	-
4.16	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CF_3	-
4.17	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CHF_2	-
4.18	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
4.19	CH_2-C(CH_3)=CH_2	CH_3	CF_3	
4.20	CH_2-C(CH_3)=CH_2	CH_3	CHF_2	
4.21	CH_2-C(CH_3)=CH_2	CH_3	CF_2Cl	
4.22	CH_2-CH=CHCl	CH_3	CF_3	-
4.23	CH_2-CH=CHCl	CH_3	CHF_2	-
4.24	CH_2-CH=CHCl	CH_3	CF_2Cl	-

Table 5: Compounds of formula Ih:

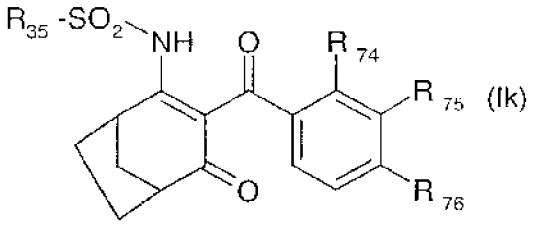


(Ih)

No.	R_{47}	R_{72}	R_{73}	physical data

No.	R_{71}	R_{72}	R_{73}	physical data
5.1	CH_2-CH=CH_2	CH_3	CF_3	-
5.2	CH_2-CH=CH_2	CH_3	CHF_2	-
5.3	CH_2-CH=CH_2	CH_3	CF_2Cl	-
5.4	CH_2-CH=CH_2	CH_2OCH_3	CF_3	-
5.5	CH_2-CH=CH_2	CH_2OCH_3	CHF_2	-
5.6	CH_2-CH=CH_2	CH_2OCH_3	CF_2Cl	-
5.7	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_3	-
5.8	CH_2-CH=CH_2	$CH_2OC_2H_5$	CHF_2	-
5.9	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
5.10	$(CH_2)_4$-CH_3	CH_3	CF_3	-
5.11	$(CH_2)_4$-CH_3	CH_3	CHF_2	-
5.12	$(CH_2)_4$-CH_3	CH_3	CF_2Cl	-
5.13	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CF_3	-
5.14	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CHF_2	-
5.15	CH_2-C(CH_3)=CH_2	CH_2OCH_3	CF_2Cl	-
5.16	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CF_3	-
5.17	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CHF_2	-
5.18	CH_2-C(CH_3)=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
5.19	CH_2-C(CH_3)=CH_2	CH_3	CF_3	
5.20	CH_2-C(CH_3)=CH_2	CH_3	CHF_2	
5.21	CH_2-C(CH_3)=CH_2	CH_3	CF_2Cl	
5.22	CH_2-CH=CHCl	CH_3	CF_3	-
5.23	CH_2-CH=CHCl	CH_3	CHF_2	-
5.24	CH_2-CH=CHCl	CH_3	CF_2Cl	-

Table 6: Compounds of formula Ik:

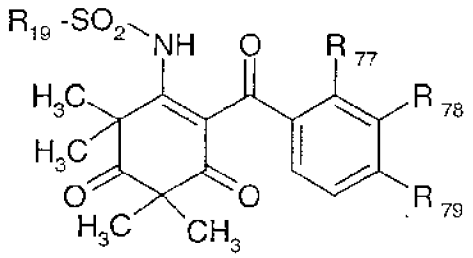


No.	R_{35}	R_{74}	R_{75}	R_{76}	physical data
6.1	CH_3	NO_2	H	Cl	-
6.2	CH_3	NO_2	H	Br	-
6.3	CH_3	NO_2	H	SCH_3	-
6.4	CH_3	NO_2	H	$SOCH_3$	-
6.5	CH_3	NO_2	H	SO_2CH_3	-
6.6	CH_3	NO_2	H	CF_3	-
6.7	C_2H_5	NO_2	H	Cl	-
6.8	C_2H_5	NO_2	H	SO_2CH_3	-
6.9	C_2H_5	NO_2	H	CF_3	-
6.10	C_3H_7	NO_2	H	Cl	-
6.11	C_3H_7	NO_2	H	SO_2CH_3	-
6.12	C_3H_7	NO_2	H	CF_3	-
6.13	CH_2-$C(CH_3)$=CH_2	NO_2	H	Cl	-
6.14	CH_2-$C(CH_3)$=CH_2	NO_2	H	SO_2CH_3	-
6.15	CH_2-$C(CH_3)$=CH_2	NO_2	H	CF_3	-
6.16	CF_3	NO_2	H	Cl	-
6.17	CF_3	NO_2	H	SO_2CH_3	178-180°C

No.	R_{73}	R_{74}	R_{75}	R_{76}	physical data
6.18	CF_3	NO_2	H	CF_3	-
6.19	CH_3	Cl	H	SO_2CH_3	-
6.20	CH_3	CF_3	H	SO_2CH_3	-
6.21	CH_3	SO_2CH_3	H	CF_3	-
6.22	C_2H_5	Cl	H	SO_2CH_3	-
6.23	C_2H_5	CF_3	H	SO_2CH_3	-
6.24	C_2H_5	SO_2CH_3	H	CF_3	-
6.25	C_3H_7	CF_3	H	SO_2CH_3	-
6.26	C_3H_7	SO_2CH_3	H	CF_3	-
6.27	CF_3	CF_3	H	SO_2CH_3	-
6.28	CF_3	SO_2CH_3	H	CF_3	-
6.29	CH_2-$C(CH_3)$=CH_2	CF_3	H	SO_2CH_3	-
6.30	CH_2-$C(CH_3)$=CH_2	SO_2CH_3	H	CF_3	-
6.31	CH_3	CH_3	OCH_3	SO_2CH_3	-
6.32	CH_3	CH_3	OC_2H_5	SO_2CH_3	-
6.33	CH_3	Cl	OCH_3	SO_2CH_3	-
6.34	CH_3	Cl	OC_2H_5	SO_2CH_3	-
6.35	C_2H_5	CH_3	OCH_3	SO_2CH_3	-
6.36	C_2H_5	CH_3	OC_2H_5	SO_2CH_3	-
6.37	C_2H_5	Cl	OCH_3	SO_2CH_3	-
6.38	C_2H_5	Cl	OC_2H_5	SO_2CH_3	-
6.39	C_3H_7	CH_3	OCH_3	SO_2CH_3	-
6.40	C_3H_7	CH_3	OC_2H_5	SO_2CH_3	-

No.	R_{35}	R_{74}	R_{75}	R_{76}	physical data
6.41	C_3H_7	Cl	OCH_3	SO_2CH_3	-
6.42	C_3H_7	Cl	OC_2H_5	SO_2CH_3	-
6.43	CF_3	CH_3	OCH_3	SO_2CH_3	-
6.44	CF_3	CH_3	OC_2H_5	SO_2CH_3	-
6.45	CF_3	Cl	OCH_3	SO_2CH_3	-
6.46	CF_3	Cl	OC_2H_5	SO_2CH_3	-
6.47	CH_2-CH=CHCl	NO_2	H	SO_2CH_3	-
6.48	CH_2-CH=CHCl	NO_2	H	CF_3	-
6.49	CH_2-CH=CHCl	CH_3	OCH_3	SO_2CH_3	-
6.50	CH_2-CH=CHCl	CH_3	OC_2H_5	SO_2CH_3	-
6.51	CH_2-CH=CHCl	Cl	OCH_3	SO_2CH_3	-
6.52	CH_2-CH=CHCl	Cl	OC_2H_5	SO_2CH_3	-
6.53	CH_3	-CH=CH-CH=N-		CF_3	-
6.54	CH_3	-CH=CH-CH=N-		Cl	-
6.55	CH_3	CH_3	$-SO_2CH_2CH_2C(CH_3)_2-$		-

Table 7: Compounds of formula Im:

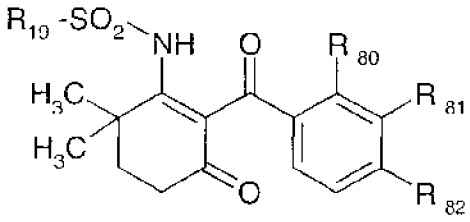


(Im)

No.	R_{76}	R_{77}	R_{78}	R_{79}	phys. data
7.1	CH_3	NO_2	H	SO_2CH_3	-
7.2	CH_3	NO_2	H	CF_3	-
7.3	CH_3	NO_2	H	Cl	-
7.4	CH_3	CH_3	OCH_3	SO_2CH_3	-
7.5	CH_3	CH_3	OC_2H_5	SO_2CH_3	-
7.6	CH_3	Cl	OCH_3	SO_2CH_3	-
7.7	CH_3	Cl	OC_2H_5	SO_2CH_3	-
7.8	CH_3	Cl	H	SO_2CH_3	-
7.9	CH_3	SO_2CH_3	H	CF_3	-
7.10	CH_3	CF_3	H	SO_2CH_3	-
7.11	CF_3	NO_2	H	SO_2CH_3	-
7.12	C_2H_5	NO_2	H	SO_2CH_3	-
7.13	n-C_3H_7	NO_2	H	SO_2CH_3	-
7.14	n-C_4H_9	NO_2	H	SO_2CH_3	-
7.15	CF_3	CH_3	OCH_3	SO_2CH_3	-
7.16	C_2H_5	CH_3	OCH_3	SO_2CH_3	-
7.17	n-C_3H_7	CH_3	OCH_3	SO_2CH_3	-
7.18	n-C_4H_9	CH_3	OCH_3	SO_2CH_3	-
7.19	CH_2-CH=CHCl	NO_2	H	SO_2CH_3	-
7.20	CH_2-CH=CHCl	NO_2	H	CF_3	-
7.21	CH_2-CH=CHCl	CH_3	OCH_3	SO_2CH_3	-
7.22	CH_2-CH=CHCl	CH_3	OC_2H_5	SO_2CH_3	-
7.23	CH_2-CH=CHCl	Cl	OCH_3	SO_2CH_3	-
7.24	CH_2-CH=CHCl	Cl	OC_2H_5	SO_2CH_3	-

No.	R_{19}	R_{77}	R_{78}	R_{79}	phys. data
7.25	CH_3	CH_3	$-SO_2CH_2CH_2SO_2-$		-
7.25	CH_3	CH_3	$-SO_2CH_2CH_2CH(OCH_3)-$		-

Table 8: Compounds of formula In:

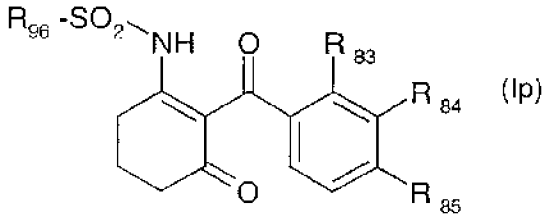


(In)

No.	R_{19}	R_{80}	R_{81}	R_{82}	phys.data
8.1	CH_3	NO_2	H	SO_2CH_3	-
8.2	CH_3	NO_2	H	CF_3	-
8.3	CH_3	NO_2	H	Cl	-
8.4	CH_3	CH_3	OCH_3	SO_2CH_3	-
8.5	CH_3	CH_3	OC_2H_5	SO_2CH_3	-
8.6	CH_3	Cl	OCH_3	SO_2CH_3	-
8.7	CH_3	Cl	OC_2H_5	SO_2CH_3	-
8.8	CH_3	Cl	H	SO_2CH_3	-
8.9	CH_3	SO_2CH_3	H	CF_3	-
8.10	CH_3	CF_3	H	SO_2CH_3	-
8.11	CF_3	NO_2	H	SO_2CH_3	-
8.12	C_2H_5	NO_2	H	SO_2CH_3	-
8.13	n-C_3H_7	NO_2	H	SO_2CH_3	-
8.14	n-C_4H_9	NO_2	H	SO_2CH_3	-
8.15	CF_3	CH_3	OCH_3	SO_2CH_3	-

No.	R_{79}	R_{80}	R_{81}	R_{82}	phys.data
8.16	C_2H_5	CH_3	OCH_3	SO_2CH_3	-
8.17	n-C_3H_7	CH_3	OCH_3	SO_2CH_3	-
8.18	n-C_4H_9	CH_3	OCH_3	SO_2CH_3	-
8.19	CH_2-CH=CHCl	NO_2	H	SO_2CH_3	-
8.20	CH_2-CH=CHCl	NO_2	H	CF_3	-
8.21	CH_2-CH=CHCl	CH_3	OCH_3	SO_2CH_3	-
8.22	CH_2-CH=CHCl	CH_3	OC_2H_5	SO_2CH_3	-
8.23	CH_2-CH=CHCl	Cl	OCH_3	SO_2CH_3	-
8.24	CH_2-CH=CHCl	Cl	OC_2H_5	SO_2CH_3	-

Table 9: Compounds of formula Ip:

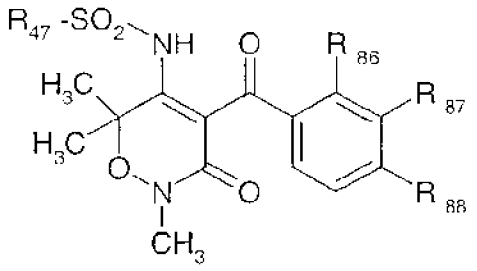


(Ip)

No.	R_{96}	R_{83}	R_{84}	R_{85}	phys.data
9.1	CH_3	NO_2	H	SO_2CH_3	191-192°C
9.2	CH_3	NO_2	H	CF_3	-
9.3	CH_3	NO_2	H	Cl	-
9.4	CH_3	CH_3	OCH_3	SO_2CH_3	-
9.5	CH_3	CH_3	OC_2H_5	SO_2CH_3	-
9.6	CH_3	Cl	OCH_3	SO_2CH_3	-
9.7	CH_3	Cl	OC_2H_5	SO_2CH_3	-

No.	R_{96}	R_{83}	R_{84}	R_{85}	phys.data
9.8	CH_3	Cl	H	SO_2CH_3	-
9.9	CH_3	SO_2CH_3	H	CF_3	-
9.10	CH_3	CF_3	H	SO_2CH_3	-
9.11	CF_3	NO_2	H	SO_2CH_3	-
9.12	C_2H_5	NO_2	H	SO_2CH_3	-
9.13	n-C_3H_7	NO_2	H	SO_2CH_3	-
9.14	n-C_4H_9	NO_2	H	SO_2CH_3	-
9.15	CF_3	CH_3	OCH_3	SO_2CH_3	-
9.16	C_2H_5	CH_3	OCH_3	SO_2CH_3	-
9.17	n-C_3H_7	CH_3	OCH_3	SO_2CH_3	-
9.18	n-C_4H_9	CH_3	OCH_3	SO_2CH_3	-
9.19	CH_2-CH=CHCl	NO_2	H	SO_2CH_3	-
9.20	CH_2-CH=CHCl	NO_2	H	CF_3	-
9.21	CH_2-CH=CHCl	CH_3	OCH_3	SO_2CH_3	-
9.22	CH_2-CH=CHCl	CH_3	OC_2H_5	SO_2CH_3	-
9.23	CH_2-CH=CHCl	Cl	OCH_3	SO_2CH_3	-
9.24	CH_2-CH=CHCl	Cl	OC_2H_5	SO_2CH_3	-
9.25	CH_3	Cl	-$SO_2CH_2CH_2C(CH_3)_2$-		-
9.26	CH_3	CH_3	-$SO_2CH_2CH_2C(CH_3)_2$-		-

Table 10: Compounds of formula Ig:

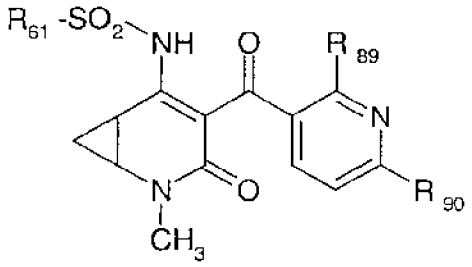


(Iq)

No.	R_{47}	R_{86}	R_{87}	R_{88}	phys.data
10.1	CH_3	NO_2	H	SO_2CH_3	-
10.2	CH_3	NO_2	H	CF_3	-
10.3	CH_3	NO_2	H	Cl	181-182°C
10.4	CH_3	CH_3	OCH_3	SO_2CH_3	-
10.5	CH_3	CH_3	OC_2H_5	SO_2CH_3	-
10.6	CH_3	Cl	OCH_3	SO_2CH_3	-
10.7	CH_3	Cl	OC_2H_5	SO_2CH_3	-
10.8	CH_3	Cl	H	SO_2CH_3	-
10.9	CH_3	SO_2CH_3	H	CF_3	-
10.10	CH_3	CF_3	H	SO_2CH_3	-
10.11	CF_3	NO_2	H	SO_2CH_3	-
10.12	C_2H_5	NO_2	H	SO_2CH_3	-
10.13	n-C_3H_7	NO_2	H	SO_2CH_3	-
10.14	n-C_4H_9	NO_2	H	SO_2CH_3	-
10.15	CF_3	CH_3	OCH_3	SO_2CH_3	-
10.16	C_2H_5	CH_3	OCH_3	SO_2CH_3	-
10.17	n-C_3H_7	CH_3	OCH_3	SO_2CH_3	-
10.18	n-C_4H_9	CH_3	OCH_3	SO_2CH_3	-
10.19	CF_3	NO_2	H	Cl	197-198°C

No.	R_{47}	R_{86}	R_{87}	R_{88}	phys.data
10.20	CH_2-CH=CHCl	NO_2	H	SO_2CH_3	-
10.21	CH_2-CH=CHCl	NO_2	H	CF_3	-
10.22	CH_2-CH=CHCl	CH_3	OCH_3	SO_2CH_3	-
10.23	CH_2-CH=CHCl	CH_3	OC_2H_5	SO_2CH_3	-
10.24	CH_2-CH=CHCl	Cl	OCH_3	SO_2CH_3	-
10.25	CH_2-CH=CHCl	Cl	OC_2H_5	SO_2CH_3	-

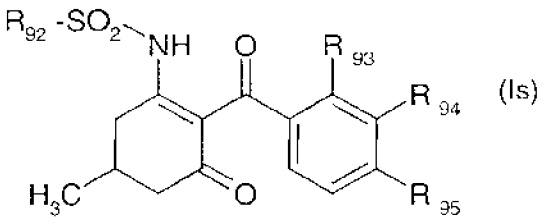
Table 11: Compounds of formula Ir:



No.	R_{61}	R_{89}	R_{90}	physical data
11.1	CH_2-CH=CH_2	CH_3	CF_3	-
11.2	CH_2-CH=CH_2	CH_3	CHF_2	-
11.3	CH_2-CH=CH_2	CH_3	CF_2Cl	-
11.4	CH_2-CH=CH_2	CH_2OCH_3	CF_3	-
11.5	CH_2-CH=CH_2	CH_2OCH_3	CHF_2	-
11.6	CH_2-CH=CH_2	CH_2OCH_3	CF_2Cl	-
11.7	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_3	-
11.8	CH_2-CH=CH_2	$CH_2OC_2H_5$	CHF_2	-
11.9	CH_2-CH=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
11.10	$(CH_2)_4$-CH_3	CH_3	CF_3	-

No.	R_{61}	R_{89}	R_{90}	physical data
11.11	$(CH_2)_4$-CH_3	CH_3	CHF_2	-
11.12	$(CH_2)_4$-CH_3	CH_3	CF_2Cl	-
11.13	CH_2-$C(CH_3)$=CH_2	CH_2OCH_3	CF_3	-
11.14	CH_2-$C(CH_3)$=CH_2	CH_2OCH_3	CHF_2	-
11.15	CH_2-$C(CH_3)$=CH_2	CH_2OCH_3	CF_2Cl	-
11.16	CH_2-$C(CH_3)$=CH_2	$CH_2OC_2H_5$	CF_3	-
11.17	CH_2-$C(CH_3)$=CH_2	$CH_2OC_2H_5$	CHF_2	-
11.18	CH_2-$C(CH_3)$=CH_2	$CH_2OC_2H_5$	CF_2Cl	-
11.19	CH_2-$C(CH_3)$=CH_2	CH_3	CF_3	-
11.20	CH_2-$C(CH_3)$=CH_2	CH_3	CHF_2	-
11.21	CH_2-$C(CH_3)$=CH_2	CH_3	CF_2Cl	-
11.22	CH_2-CH=CHCl	CH_3	CF_3	-
11.23	CH_2-CH=CHCl	CH_3	CHF_2	-
11.24	CH_2-CH=CHCl	CH_3	CF_2Cl	-
11.25	CH_3	CH_3	SO_2CH_3	-
11.26	CH_3	C_2H_5	SO_2CH_3	-
11.27	CH_3	CH_3	CF_3	-
11.28	CH_3	CH_3	CHF_2	-
11.29	CH_3	CH_3	CF_2Cl	-
11.30	CH_3	C_2H_5	CF_3	-
11.31	CH_3	C_2H_5	CHF_2	-
11.32	CH_3	C_2H_5	CF_2Cl	-

Table 12: Compounds of formula Is:



No.	R_{92}	R_{93}	R_{94}	R_{95}	phys. data
12.1	CH_3	NO_2	H	SO_2CH_3	-
12.2	CH_3	NO_2	H	CF_3	-
12.3	CH_3	NO_2	H	Cl	-
12.4	CH_3	CH_3	OCH_3	SO_2CH_3	-
12.5	CH_3	CH_3	OC_2H_5	SO_2CH_3	-
12.6	CH_3	Cl	OCH_3	SO_2CH_3	-
12.7	CH_3	Cl	OC_2H_5	SO_2CH_3	-
12.8	CH_3	Cl	H	SO_2CH_3	-
12.9	CH_3	SO_2CH_3	H	CF_3	-
12.10	CH_3	CF_3	H	SO_2CH_3	-
12.11	CF_3	NO_2	H	SO_2CH_3	-
12.12	C_2H_5	NO_2	H	SO_2CH_3	-
12.13	n-C_3H_7	NO_2	H	SO_2CH_3	-
12.14	n-C_4H_9	NO_2	H	SO_2CH_3	-
12.15	CF_3	CH_3	OCH_3	SO_2CH_3	-
12.16	C_2H_5	CH_3	OCH_3	SO_2CH_3	-
12.17	n-C_3H_7	CH_3	OCH_3	SO_2CH_3	-
12.18	n-C_4H_9	CH_3	OCH_3	SO_2CH_3	-
12.19	CH_2-CH=CHCl	NO_2	H	SO_2CH_3	-
12.20	CH_2-CH=CHCl	NO_2	H	CF_3	-

No.	R_{92}	R_{93}	R_{94}	R_{95}	phys. data
12.21	CH_2-CH=CHCl	CH_3	OCH_3	SO_2CH_3	-
12.22	CH_2-CH=CHCl	CH_3	OC_2H_5	SO_2CH_3	-
12.23	CH_2-CH=CHCl	Cl	OCH_3	SO_2CH_3	-
12.24	CH_2-CH=CHCl	Cl	OC_2H_5	SO_2CH_3	-
12.25	CH_3	NO_2	H	$SO_2C_2H_5$	-
12.26	CH_3	NO_2	H	$SOCH_3$	-
12.27	CH_3	NO_2	H	SCH_3	-
12.28	CH_3	CH_3	OCH_3	$SO_2C_2H_5$	-
12.29	CH_3	CH_3	OC_2H_5	$SO_2C_2H_5$	-
12.30	CH_3	Cl	OCH_3	$SO_2C_2H_5$	-
12.31	CH_3	Cl	OC_2H_5	$SO_2C_2H_5$	-
12.32	CH_3	Cl	H	$SO_2C_2H_5$	-
12.33	CH_3	SO_2CH_3	H	SCH_3	-
12.34	CH_3	CF_3	H	$SO_2C_2H_5$	-
12.35	CF_3	NO_2	H	$SO_2C_2H_5$	-
12.36	C_2H_5	NO_2	H	$SO_2C_2H_5$	-
12.37	n-C_3H_7	NO_2	H	$SO_2C_2H_5$	-
12.38	n-C_4H_9	NO_2	H	$SO_2C_2H_5$	-
12.39	CF_3	CH_3	OCH_3	$SO_2C_2H_5$	-
12.40	C_2H_5	CH_3	OCH_3	$SO_2C_2H_5$	-
12.41	n-C_3H_7	CH_3	OCH_3	$SO_2C_2H_5$	-
12.42	n-C_4H_9	CH_3	OCH_3	$SO_2C_2H_5$	-
12.43	CH_2-CH=CHCl	NO_2	H	$SO_2C_2H_5$	-
12.44	CH_2-CH=CHCl	NO_2	H	SCH_3	-

No.	R_{92}	R_{93}	R_{94}	R_{95}	phys. data
12.45	CH_2-CH=CHCl	CH_3	OCH_3	$SO_2C_2H_5$	-
12.46	CH_2-CH=CHCl	CH_3	OC_2H_5	$SO_2C_2H_5$	-
12.47	CH_2-CH=CHCl	Cl	OCH_3	$SO_2C_2H_5$	-
12.48	CH_2-CH=CHCl	Cl	OC_2H_5	$SO_2C_2H_5$	-
12.49	CH_3	NO_2	H	$SO_2C_2H_5$	-
12.50	CH_3	NO_2	H	$SOCH_3$	-
12.51	CH_3	NO_2	H	SCH_3	-
12.52	CH_3	CH_3	OCH_3	$SO_2C_2H_5$	-
12.53	CH_3	CH_3	OC_2H_5	$SO_2C_2H_5$	-
12.54	CH_3	Cl	OCH_3	$SO_2C_2H_5$	-
12.55	CH_3	Cl	OC_2H_5	$SO_2C_2H_5$	-
12.56	CH_3	Cl	H	$SO_2C_2H_5$	-
12.57	CH_3	SO_2CH_3	H	SCH_3	-
12.58	CH_3	CF_3	H	$SO_2C_2H_5$	-
12.59	CF_3	NO_2	H	$SO_2C_2H_5$	-
12.60	C_2H_5	NO_2	H	$SO_2C_2H_5$	-
12.61	n-C_3H_7	NO_2	H	$SO_2C_2H_5$	-
12.62	n-C_4H_9	NO_2	H	$SO_2C_2H_5$	-
12.63	CF_3	CH_3	OCH_3	$SO_2C_2H_5$	-
12.64	C_2H_5	CH_3	OCH_3	$SO_2C_2H_5$	-
12.65	n-C_3H_7	CH_3	OCH_3	$SO_2C_2H_5$	-
12.66	n-C_4H_9	CH_3	OCH_3	$SO_2C_2H_5$	-
12.67	CH_2-CH=CHCl	NO_2	H	$SO_2C_2H_5$	-
12.68	CH_2-CH=CHCl	NO_2	H	SCH_3	-

No.	R_{92}	R_{93}	R_{94}	R_{95}	phys. data
12.69	CH_2-CH=CHCl	CH_3	OCH_3	$SO_2C_2H_5$	-
12.70	CH_2-CH=CHCl	CH_3	OC_2H_5	$SO_2C_2H_5$	-
12.71	CH_2-CH=CHCl	Cl	OCH_3	$SO_2C_2H_5$	-
12.72	CH_2-CH=CHCl	Cl	OC_2H_5	$SO_2C_2H_5$	-

Biological Examples

Example B1: Herbicidal action before emergence of the plants (pre-emergence action)

Monocotyledonous and dicotyledonous test plants are sown in standard soil in plastic pots. Immediately after sowing, an aqueous suspension (prepared from a 25 % wettable powder (Example F3, b) according to WO 97/34485) or an emulsion (prepared from a 25 % emulsifiable concentrate (Example F1, c)) of the test compounds is applied by spraying at a rate of application corresponding to 250 g a.i./ha (500 litres water/ha). The test plants are then cultivated in a greenhouse under optimum conditions. After 3 weeks the test is evaluated in accordance with a scale of nine ratings (1 = total damage, 9 = no action). Ratings of from 1 to 4 (especially from 1 to 3) indicate good to very good herbicidal action.

Table B1: Pre-emergence action of the compounds of formula I:

Example No.	SETARIA	PANICUM	DIGITARIA	ECHINOCHLOA	BRACHIARIA	ABUTILON	XANTHIUM	CHENOPODIUM
2.19	2	1	1	1	1	1	3	2
2.13	3	2	3	2	2	2	3	1

The same results are obtained when the compounds of formula I are formulated in accordance with Examples F2 and F4 to F8 according to WO 97/34485.

Example B2: Post-emergence herbicidal action

Monocotyledonous and dicotyledonous test plants are raised in a greenhouse in plastic pots containing standard soil and at the 4- to 6-leaf stage are sprayed with an aqueous suspension of the test compounds of formula I (prepared from a 25 % wettable powder

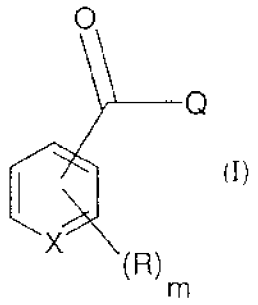
(Example F3, b) according to WO 97/34485) or with an emulsion of the test compounds of formula I (prepared from a 25 % emulsifiable concentrate (Example F1, c) according to WO 97/34485) at a rate of application corresponding to 250 g a.i./ha (500 litres water/ha). The test plants are then grown on in the greenhouse under optimum conditions. After about 18 days the test is evaluated in accordance with a scale of nine ratings (1 = total damage, 9 = no action). Ratings of from 1 to 4 (especially from 1 to 3) indicate good to very good herbicidal action. In this test too, the compounds of formula I exhibit strong herbicidal action.

Table B2: Post-emergence action of the compounds of formula I:

Example No.	PANICUM	DIGITARIA	ECHINO-CHLOA	EUPHORIA	ABUTILON	XANTHIUM	CHENO-PODIUM	SINAPIS	STELLARIA
2.19	1	1	2	2	2	2	1	2	2
2.13	3	3	3	3	3	3	1	3	2

What is claimed is:

1. A compound of formula I



(I)

wherein X is methine, nitrogen or N=O;

m is 1, 2, 3 or 4;

each R is independently hydrogen, C_1-C_6alkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_2-C_6-alkynyl, C_2-C_6haloalkynyl, C_3-C_6cycloalkyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_1-C_6alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkyl, C_1-C_6haloalkylthio, C_1-C_5haloalkyl-sulfinyl, C_1-C_6haloalkylsulfonyl, C_1-C_6alkoxycarbonyl, C_1-C_6alkylcarbonyl, C_1-C_5alkylamino, di-C_1-C_6alkylamino, C_1-C_6alkylaminosulfonyl, di-C_1-C_6alkylaminosulfonyl, -N(R_1)-S-R_2, -N(R_3)-SO-R_4, -N(R_5)-SO_2-R_6, nitro, cyano, halogen, hydroxy, amino, formyl, hydroxy-C_1-C_6alkyl, C_1-C_5alkoxy-C_1-C_6alkyl, C_1-C_6alkoxycarbonyloxy-C_1-C_5alkyl, C_1-C_6alkylthio-C_1-C_6alkyl, C_1-C_5alkylsulfinyl-C_1-C_6alkyl, C_1-C_6alkylsulfonyl-C_1-C_6alkyl, rhodano-C_1-C_6alkyl, cyano-C_1-C_6alkyl, oxiranyl, C_3-C_5alkenyloxy, C_3-C_6alkynyloxy, C_1-C_6alkoxy-C_1-C_6alkoxy-C_1-C_3alkyl, C_1-C_5alkoxy-C_1-C_6alkoxy, cyano-C_1-C_6alkenyloxy, C_1-C_6alkoxycarbonyloxy-C_1-C_6alkoxy, C_3-C_6alkynyloxy, cyano-C_1-C_6alkoxy, C_1-C_6alkoxycarbonyl-C_1-C_6alkoxy-C_1-C_3alkyl, C_1-C_6alkoxycarbonyl-C_1-C_6alkoxy, C_1-C_6alkylthio-C_1-C_6alkoxy, C_1-C_6alkylthio-C_1-C_6alkoxy-C_1-C_3alkyl, alkoxycarbonyl-C_1-C_6alkylthio, alkoxycarbonyl-C_1-C_6alkylthio-C_1-C_3-alkyl, alkoxycarbonyl-C_1-C_6alkylsulfinyl, alkoxycarbonyl-C_1-C_6alkylsulfinyl-C_1-C_3alkyl, alkoxycarbonyl-C_1-C_6alkylsulfonyl, alkoxycarbonyl-C_1-C_6alkylsulfonyl-C_1-C_3alkyl, C_1-C_6-alkylsulfonyloxy, C_1-C_6haloalkylsulfonyloxy, phenyl, benzyl, phenoxy, phenylthio, phenylsulfinyl, phenylsulfonyl, benzylthio, benzylsulfinyl or benzylsulfonyl, wherein the phenyl and benzyl groups may themselves be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6-alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6-haloalkylthio, C_3-C_6alkenylthio, C_3-C_6haloalkenylthio, C_3-C_6alkynylthio, C_2-C_6alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxycarbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl,

C_1-C_6haloalkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2-alkylaminosulfonyl, C_2-C_4dialkylaminosulfonyl, R_7-C_1-C_3alkylene-, NR_8R_9, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein those phenylthio and benzylthio groups may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;

or each R is independently a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur;

the ring system either being bonded directly to the ring containing the substituent X or being bonded to the ring containing the substituent X by way of a C_1-C_4alkylene group;

and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6haloalkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxycarbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_4alkyl-aminosulfonyl, C_1-C_4dialkylaminosulfonyl, R_{10}-C_1-C_3alkylene, $NR_{11}R_{12}$, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents at the nitrogen atom in the heterocyclic ring are free of halogen;

R_1, R_3 and R_5 are each independently of the others hydrogen or C_1-C_6alkyl;

R_2 is $NR_{13}R_{14}$, C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6cycloalkyl or phenyl, wherein phenyl may itself be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;

R_4 is $NR_{15}R_{16}$, C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6cycloalkyl or phenyl, wherein phenyl may itself be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;

R_6 is $NR_{17}R_{18}$, C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6cycloalkyl or phenyl, wherein phenyl may itself be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;

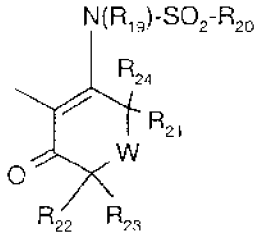
R_7 and R_{10} are each independently of the other C_1-C_3alkoxy, C_2-C_4alkoxycarbonyl, C_1-C_3-alkylthio, C_1-C_3alkylsulfinyl, C_1-C_3alkylsulfonyl or phenyl, wherein phenyl may itself be

substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro;

R_8, R_{11}, R_{13}, R_{15} and R_{17} are each independently of the others C_1-C_{12}alkyl;

R_9, R_{12}, R_{14}, R_{16} and R_{18} are each independently of the others C_1-C_{12}alkyl, or R_8 and R_9 together, and/or R_{11} and R_{12} together, and/or R_{13} and R_{14} together, and/or R_{15} and R_{16} together, and/or R_{17} and R_{18} together, with the nitrogen atom to which they are bonded, form a 3- to 7-membered ring;

Q is the group Q_1



(Q_1) ,

wherein

R_{19} is hydrogen or C_1-C_6alkyl;

R_{20} is C_1-C_{12}alkyl, C_1-C_{12}haloalkyl, C_2-C_{12}alkenyl, C_2-C_6haloalkenyl, C_1-C_2alkoxycarbonyl- or phenyl-substituted vinyl, or is C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6allenyl, C_3-C_6cycloalkyl, $NR_{32}R_{33}$, benzyl or phenyl,

wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3-haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{20} is hydroxy-C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkylsulfinyl-C_1-C_{12}-alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_6alkylcarbonyloxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_6oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl or formyl-C_1-C_{12}alkyl;

or R_{20} is a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, the ring system being bonded to the sulfur atom of the $-N(R_{19})-S(O)_2$- group by way of a C_1-C_{12}alkylene group, and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6-alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_3alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio,

C_3-C_6haloalkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_5-alkoxycarbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2alkylaminosulfonyl, di(C_1-C_2-alkyl)aminosulfonyl, di(C_1-C_4alkyl)amino, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents on the nitrogen atom in the hetero-cyclic ring are other than halogen;

R_{21}, R_{22}, R_{23} and R_{24} are each independently of the others hydrogen, C_1-C_6alkyl, C_1-C_5-haloalkyl, C_2-C_6alkenyl, C_2-C_6alkynyl, C_1-C_6alkoxycarbonyl, C_1-C_6alkylcarbonyl, C_1-C_6-alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6alkyl-NHS(O)$_2$, C_1-C_6alkylamino, di-(C_1-C_6alkyl)amino, hydroxy, C_1-C_6alkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, hydroxy-C_1-C_6-alkyl, C_1-C_4alkylsulfonyloxy-C_1-C_6alkyl, tosyloxy-C_1-C_6alkyl, halogen, cyano, nitro, phenyl or phenyl substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkyl-carbonyl, C_1-C_4alkoxycarbonyl, amino, C_1-C_4alkylamino, di-C_1-C_4alkylamino, C_1-C_6alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_4alkylsulfonyloxy, C_1-C_6haloalkylthio, C_1-C_6-haloalkylsulfinyl, C_1-C_6haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-S(O)$_2$NH, C_1-C_6alkylthio-N(C_1-C_4alkyl), C_1-C_6alkylsulfinyl-N(C_1-C_4alkyl), C_1-C_6alkylsulfonyl-N(C_1-C_4-alkyl), halogen, nitro, COOH or by cyano; or R_{24} and R_{21} together or R_{22} and R_{23} together denote C_2-C_6alkylene, C(O)OCH$_2$CH$_2$-, C(O)OCH$_2$CH$_2$CH$_2$-, S-C_2-C_4alkylene, S(O)-C_2-C_4-alkylene or S(O)$_2$-C_2-C_4alkylene;

W is oxygen, sulfur, sulfinyl, sulfonyl, -CR$_{25}$, R$_{26}$-, -C(O)-, -CR$_{28}$R$_{29}$-CR$_{30}$R$_{31}$- or -NR$_{27}$-, wherein the carbon atom carrying the substituents R$_{28}$R$_{29}$ is attached to the carbon atom carrying the substituents R$_{22}$R$_{23}$;

R_{25} is hydrogen, C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy-C_1-C_4alkyl, C_1-C_4alkylthio-C_1-C_4-alkyl, C_1-C_4alkylthio-C_3-C_6cycloalkyl, C_1-C_4alkylcarbonyloxy-C_1-C_4alkyl, C_1-C_4alkylsulfonyl-oxy-C_1-C_4alkyl, tosyloxy-C_1-C_4alkyl, di(C_1-C_3alkoxyalkyl)methyl, di(C_1-C_3alkylthioalkyl)-methyl, (C_1-C_3alkoxyalkyl)-(C_1-C_3alkylthioalkyl)methyl, C_3-C_5oxacycloalkyl, C_3-C_5thiacyclo-alkyl, C_3-C_4dioxacycloalkyl, C_3-C_4dithiacycloalkyl, C_3-C_4oxathiacycloalkyl, formyl, C_1-C_4-alkoxycarbonyl, carbamoyl, C_1-C_4alkylaminocarbonyl, di(C_1-C_4alkyl)aminocarbonyl, phenylaminocarbonyl, benzylaminocarbonyl or phenyl which may itself be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4-alkoxycarbonyl, amino, C_1-C_4alkylamino, di-C_1-C_4alkylamino, C_1-C_4alkylthio, C_1-C_4alkyl-

sulfinyl, C_1-C_4alkylsulfonyl, C_1-C_4alkylsulfonyloxy, C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-$S(O)_2NH$, C_1-C_5alkylthio-$N(C_1$-C_4alkyl), C_1-C_6alkylsulfinyl-$N(C_1$-C_4alkyl), C_1-C_6alkylsulfonyl-$N(C_1$-C_4alkyl), halogen, nitro, COOH or by cyano; or R_{26} together with R_{23} or R_{24} denotes C_1-C_5alkylene;

R_{26} is hydrogen, C_1-C_4alkyl or C_1-C_4haloalkyl, or R_{26} together with R_{25} denotes C_2-C_6-alkylene;

R_{27} is hydrogen, C_1-C_4alkyl, C_1-C_4alkoxycarbonyl or phenyl which may itself be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4-alkoxycarbonyl, C_1-C_4alkylamino, di-C_1-C_4alkylamino, C_1-C_4alkylthio, C_1-C_4alkylsulfinyl, C_1-C_4alkylsulfonyl, C_1-C_4alkylsulfonyloxy, C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4-haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-$S(O)_2NH$, C_1-C_4alkyl-$S(O)_2N(C_1$-C_4-alkyl), halogen, nitro or by cyano;

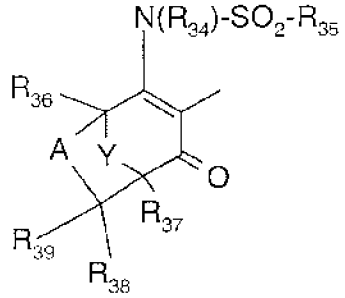
R_{28}, R_{29}, R_{30} and R_{31} are each independently of the others hydrogen or C_1-C_6alkyl, or R_{26} or R_{28} or R_{30} together with R_{21} or R_{23} form a direct bond;

R_{32} is C_1-C_{12}alkyl;

R_{33} is C_1-C_{12}alkyl, or R_{32} and R_{33} together with the nitrogen atom to which they are bonded form a 3- to 7-membered ring;

with the proviso that R_{20} is other than C_1-C_{12}alkyl and C_1-C_4haloalkyl when X is nitrogen or NO, the group -C(O)-Q occupies the 3-position in the ring and R in the 6-position in the ring is C_1-C_6haloalkyl;

or Q is the group Q_2



(Q_2),

wherein

R_{34} is hydrogen or C_1-C_6alkyl;

R_{35} is C_1-C_{12}alkyl, C_1-C_{12}haloalkyl, C_2-C_{12}alkenyl, C_2-C_6haloalkenyl, C_1-C_2alkoxycarbonyl- or phenyl-substituted vinyl, or is C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6allenyl, C_3-C_6cycloalkyl, $NR_{51}R_{52}$, benzyl or phenyl,

wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3-haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{35} is hydroxy-

C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkylsulfinyl-C_1-C_{12}-alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_6alkylcarbonyloxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_5oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl or formyl-C_1-C_{12}alkyl;

or R_{35} is a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, the ring system being bonded to the sulfur atom of the $-N(R_{34})-S(O)_2-$ group by way of a C_1-C_{12}alkylene group, and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6-haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6halo-alkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxy-carbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6alkyl-sulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2alkylaminosulfonyl, di(C_1-C_2alkyl)-aminosulfonyl, di(C_1-C_4alkyl)amino, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents on the nitrogen atom in the hetero-cyclic ring are other than halogen;

Y is a chemical bond, an alkylene group A_1, carbonyl, oxygen, sulfur, sulfinyl, sulfonyl, $-NR_{40}$ or $NH(CO)R_{41}$;

A_1 is $C(R_{42}R_{43})m_{01}$;

A is $C(R_{44}R_{45})r$;

r and m_{01} are each independently of the other 0, 1 or 2;

R_{36} is hydrogen, methyl or C_1-C_3alkoxycarbonyl;

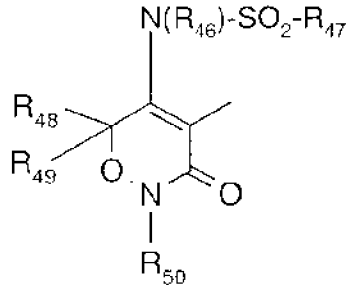
R_{37}, R_{38}, R_{39}, R_{44}, R_{45}, R_{42} and R_{43} are each independently of the others hydrogen, C_1-C_4-alkoxy, C_1-C_4alkylthio, C_1-C_4alkylsulfinyl, C_1-C_4alkylsulfonyl, halogen or methyl, or R_{39} together with an adjacent group R_{45} or R_{43} denotes a chemical bond;

R_{40} and R_{41} are each independently of the other hydrogen or C_1-C_4alkyl;

R_{51} is C_1-C_{12}alkyl; and

R_{52} is C_1-C_{12}alkyl; or R_{51} and R_{52} together with the nitrogen atom to which they are bonded form a 3- to 7-membered ring; with the proviso that R_{34} is C_5-C_6alkyl when R_{35} is C_1-C_4alkyl or C_1-C_4haloalkyl and X is nitrogen or NO;

or Q is the group Q_3



(Q_3),

wherein

R_{46} is hydrogen or C_1-C_6alkyl;

R_{47} is C_1-C_{12}alkyl, C_1-C_{12}haloalkyl, C_2-C_{12}alkenyl, C_2-C_6haloalkenyl, C_1-C_2alkoxycarbonyl- or phenyl-substituted vinyl, or is C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6allenyl, C_3-C_6cycloalkyl, $NR_{53}R_{54}$, benzyl or phenyl, wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{47} is hydroxy-C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkylsulfinyl-C_1-C_{12}alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_6-alkylcarbonyloxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_6oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl or formyl-C_1-C_{12}alkyl;

or R_{47} is a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, the ring system being bonded to the sulfur atom of the $-N(R_{46})-S(O)_2-$ group by way of a C_1-C_{12}alkylene group, and each ring system may contain no more than two oxygen atoms and no more more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6-alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6haloalkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6-alkoxycarbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2alkylaminosulfonyl, di(C_1-C_2-alkyl)aminosulfonyl, di(C_1-C_4alkyl)amino, halogen, cyano, nitro, phenylthio and/or by

benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents at the nitrogen atom in the heterocyclic ring are free of halogen;

R_{48} and R_{49} are each independently of the other hydrogen, C_1-C_4alkyl, C_2-C_6alkenyl, C_2-C_6-alkynyl, C_1-C_4alkoxycarbonyl, C_1-C_6alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_4-alkyl-NHS(O)$_2$, C_1-C_4haloalkyl, or phenyl which may itself be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4alkoxycarbonyl, amino, C_1-C_4alkylamino, di-C_1-C_4alkylamino, C_1-C_6alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6-alkylsulfonyl, C_1-C_4alkylsulfonyloxy, C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4-haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-S(O)$_2$NH, C_1-C_4alkyl-S(O)$_2$N(C_1-C_4-alkyl), halogen, nitro, COOH or by cyano; or R_{48} and R_{49} together form a C_2-C_6alkylene bridge; and

R_{50} is hydrogen, C_1-C_6alkyl, C_3-C_6alkenyl, C_3-C_6alkynyl, C_1-C_4alkoxycarbonyl, benzyl or phenyl, wherein benzyl or phenyl may themselves be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4-haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4alkoxycarbonyl, amino, C_1-C_4alkylamino, di-C_1-C_4-alkylamino, C_1-C_4alkylthio, C_1-C_4alkylsulfinyl, C_1-C_4alkylsulfonyl, C_1-C_4alkylsulfonyloxy,

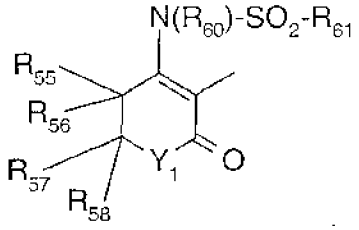
C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-S(O)$_2$NH, C_1-C_4alkyl-S(O)$_2$N(C_1-C_4alkyl), halogen, nitro, COOH or by cyano;

R_{53} is C_1-C_{12}alkyl and

R_{54} is C_1-C_{12}alkyl, or R_{53} and R_{54} together with the nitrogen atom to which they are bonded form a 3- to 7-membered ring;

with the proviso that R_{45} is C_5-C_6alkyl when R_{47} is C_1-C_4alkyl or C_1-C_4haloalkyl and X is nitrogen or NO;

or Q is the group Q_4



(Q_4),

wherein R_{60} is hydrogen or C_1-C_6alkyl;

R_{61} is C_1-C_{12}alkyl, C_1-C_{12}haloalkyl, C_2-C_{12}alkenyl, C_2-C_6haloalkenyl, C_1-C_2alkoxycarbonyl- or phenyl-substituted vinyl, or is C_3-C_6alkynyl, C_3-C_6haloalkynyl, C_3-C_6allenyl, C_3-C_6cycloalkyl,

$NR_{62}R_{63}$, benzyl or phenyl, wherein the phenyl-containing groups may themselves be substituted by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, or R_{61} is hydroxy-C_1-C_{12}alkyl, C_1-C_4alkoxy-C_1-C_{12}alkyl, C_1-C_4alkylthio-C_1-C_{12}alkyl, C_1-C_4alkylsulfinyl-C_1-C_{12}alkyl, C_1-C_4alkylsulfonyl-C_1-C_{12}alkyl, cyano-C_1-C_{12}alkyl, C_1-C_6-alkylcarbonyloxy-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyl-C_1-C_{12}alkyl, C_1-C_4alkoxycarbonyloxy-C_1-C_{12}alkyl, -rhodano-C_1-C_{12}alkyl, benzoyloxy-C_1-C_{12}alkyl, C_2-C_6oxiranyl, C_1-C_4alkylamino-C_1-C_{12}alkyl, di(C_1-C_4alkyl)amino-C_1-C_{12}alkyl, C_1-C_{12}alkylthiocarbonyl-C_1-C_{12}alkyl or formyl-C_1-C_{12}alkyl;

or R_{61} is a five- to ten-membered monocyclic or fused bicyclic ring system, which may be aromatic or partially saturated and may contain from 1 to 4 hetero atoms selected from nitrogen, oxygen and sulfur, the ring system being bonded to the sulfur atom of the $-N(R_{60})-S(O)_2-$ group by way of a C_1-C_2alkylene group, and each ring system may contain no more than two oxygen atoms and no more than two sulfur atoms, and the ring system itself may be mono-, di- or tri-substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_2-C_6alkenyl, C_2-C_6-haloalkenyl, C_2-C_6alkynyl, C_2-C_6haloalkynyl, C_1-C_6alkoxy, C_1-C_6haloalkoxy, C_3-C_6alkenyloxy, C_3-C_6alkynyloxy, mercapto, C_1-C_6alkylthio, C_1-C_6haloalkylthio, C_3-C_6alkenylthio, C_3-C_6halo-alkenylthio, C_3-C_6alkynylthio, C_2-C_5alkoxyalkylthio, C_3-C_5acetylalkylthio, C_3-C_6alkoxy-carbonylalkylthio, C_2-C_4cyanoalkylthio, C_1-C_6alkylsulfinyl, C_1-C_6haloalkylsulfinyl, C_1-C_6-alkylsulfonyl, C_1-C_6haloalkylsulfonyl, aminosulfonyl, C_1-C_2alkylaminosulfonyl, di(C_1-C_2-alkyl)aminosulfonyl, di(C_1-C_4alkyl)amino, halogen, cyano, nitro, phenylthio and/or by benzylthio, wherein phenylthio and benzylthio may themselves be substituted on the phenyl ring by C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_1-C_3haloalkoxy, halogen, cyano or by nitro, and wherein the substituents at the nitrogen atom in the heterocyclic ring are free of halogen;

R_{62} is C_1-C_{12}alkyl and

R_{63} is C_1-C_{12}alkyl, or R_{62} and R_{63} together with the nitrogen atom to which they are bonded form a 3- to 7-membered ring;

Y_1 is oxygen or NR_{59};

R_{59} is hydrogen, C_1-C_6alkyl, C_3-C_6alkenyl, C_3-C_6alkynyl, C_1-C_4alkoxycarbonyl, benzyl or phenyl, wherein benzyl or phenyl may themselves be substituted by C_1-C_6alkyl, C_1-C_6haloalkyl, C_1-C_6alkoxy, C_1-C_6-haloalkoxy, C_1-C_6alkylcarbonyl, C_1-C_6alkoxycarbonyl, amino, C_1-C_4alkylamino, C_1-C_4-dialkylamino, C_1-C_6alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_4alkylsulfonyloxy,

C_1-C_4haloalkylthio, C_1-C_4haloalkylsulfinyl, C_1-C_4haloalkylsulfonyl, C_1-C_4haloalkylsulfonyloxy, C_1-C_4alkyl-$S(O)_2NH$, C_1-C_4alkyl-$S(O)_2N(C_1$-C_4alkyl), halogen, nitro, COOH or by cyano; R_{55}, R_{56}, R_{57} and R_{58} are each independently of the others hydrogen, hydroxy-C_1-C_4alkyl, C_1-C_6alkyl, C_1-C_4alkoxy-C_1-C_4alkyl, C_2-C_6alkenyl, C_2-C_6alkynyl, C_1-C_6alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6alkylsulfinyl, C_1-C_6alkylsulfonyl, C_1-C_4alkylaminosulfonyl, C_1-C_4haloalkyl, C_1-C_6alkylsulfonyloxy-C_1-C_4alkyl, phenylsulfonyloxy-C_1-C_4alkyl, C_1-C_6alkylamino, C_1-C_6-dialkylamino, C_1-C_6alkoxy or phenyl, wherein the phenyl group may itself be substituted by C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4alkoxy, C_1-C_4haloalkoxy, C_1-C_4alkylcarbonyl, C_1-C_4-alkoxycarbonyl, halogen, nitro, COOH or by cyano, or R_{55} and R_{56} together form a C_2-C_5-alkylene chain, or R_{55} and R_{57} together form a chemical bond or a C_1-C_4alkylene chain, or R_{57} together with R_{59} forms a chemical bond or a C_3-C_4alkylene chain;
or an agrochemically tolerable salt or any stereoisomer or tautomer of a compound of formula I.

2. A herbicidal and plant-growth-inhibiting composition that comprises a herbicidally effective amount of a compound of formula I on an inert carrier.

3. A method of controlling undesired plant growth, which comprises applying a herbicidally effective amount of a compound of formula I or of a composition comprising that compound to the plants or to their locus.

4. A method of inhibiting plant growth, which comprises applying a herbicidally effective amount of a compound of formula I or of a composition comprising that compound to the plants or to their locus.

5. The use of a composition according to claim 2 in controlling undesired plant growth.

INTERNATIONAL SEARCH REPORT

Internation Application No
PCT/EP 01/02581

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C07D213/50 A01N43/40 C07C311/07 A01N47/04 A01N47/02
C07D265/02 A01N43/58

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, BEILSTEIN Data, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 June 2001	19/06/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Gettins, M

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Internatio· Application No
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A	EP 0 353 187 A (CIBA GEIGY AG) 31 January 1990 (1990-01-31) claim 1	1-5
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